THE

# LONDON JOURNAL

OF

# Arts and Sciences;

AND

# REPERTORY

OF

# PATENT INVENTIONS.

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CONDUCTED

**BY W. NEWTON,**

CIVIL ENGINEER AND MECHANICAL DRAFTSMAN.

*(Assisted by several Scientific Gentlemen.)*

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## VOL. V.

*(CONJOINED SERIES.)*

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**London:**

PUBLISHED BY SHERWOOD, GILBERT, AND PIPER, PATERNOSTER ROW; SIMPKIN AND MARSHALL, STATIONERS' COURT; AND W. NEWTON, OFFICE FOR PATENTS, 66, CHANCERY LANE; AND BENNIS, RUE NEUVE, ST. AUGUSTIN, PARIS.

1835.

505
LON/I
Vol. 5 (compound series)
1835

CUNNINGHAM AND SALMON, PRINTERS, CROWN-COURT,
FLEET-STREET.

Ontario Jackman Public Library
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CONJOINED SERIES.


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II. Arnott's Improved Pens and Penholders; Morgan's Apparatus for Heating and Ventilating.

III. Dodd's Improved Valves; Angilbert's Preserving Cases; Lewty's Castors; Carr's Cloth-dressing Apparatus.

IV. Wordsworth's Flax-dressing Machine; Gerard's Improved Press; Predeval's Motive Power; Baker's Improved Chronometer.

V. Goddard's Weighing Machine.

VI. North's Improved Roofing; Jones's Spinning Machinery; Gillett's Gun; Stevens's Brick Machinery.

VII. Wright's Power Engine; Holmes's Steam Machinery; Calvert's Improved Saddle.

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THE
London
JOURNAL OF ARTS AND SCIENCES.

No. XXVII.

[SECOND SERIES.]

PUBLIC LIBRARY 1859

# Original Communications.

## ART. III.—ON HEATING AND VENTILATING HOT HOUSES.

*To the Editors of the London Journal of Arts, &c.*

GENTLEMEN,—Of all plans hitherto adopted for heating hot houses, that by means of boiling water seems to have obtained a decided preference. Various alterations and improvements have taken place since the origin of the system, but all the projectors have gone, and still go, upon the supposition that a cistern, with returning pipe or pipes are absolutely necessary, and which consequently renders the apparatus more complicated and expensive than the plan of heating by boiling water requires.

The last and greatest improvement upon this system of heating, is allowed, I believe, to have been made by Mr. Weeks.*

* For a description of Week's Patent, see page 63.

His plan is to have a broad, flat, thin pipe, extending from the boiler to the far end of the house, with [illegible]ised upon the top of it, for the purpose of retain[illegible] and producing vapour; at the end of t[illegible] a small [illegible]rn, and into this cistern not only one pipe is introduced, but two returning pipes; one of great and another of smaller dimensions, either of which is to be used at the discretion of the gardener. Now it appears to me, that by proper management, the system requires neither cistern, returning pipe or pipes, nor water retained upon the top of them for producing vapour, and that the present plans (if I am not mistaken) are far, very far, from being the best that the system of heating hot houses by boiling water is capable of being reduced to.

I do not wish to depreciate the ability of so deserving a man as Mr. Weeks, whose plans are so highly spoken of in that excellent publication, the Gardener's Magazine, but having, as I think I have, discovered a more effectual and less expensive method, I cannot withhold my improvement upon the system from the public, although my plan may interfere with those of professional projectors upon the subject, it is original, and infringes upon none which have hitherto preceded it; and now I shall endeavour to exemplify my views upon the best method of heating hot houses by boiling water, and also of ventilating them when the temperature is too high, by the accompanying sketches, (see Plate V.) and a very short description of the same.

Fig. 1, is a cross section of the hot house and back shed, taken through the pit wall opposite to the boiler at the end of the hot house; fig. 2, is an elevation of part of the front of the pit, shewing the hot water pipe resting upon cast iron brackets, which support the coping, and also the fire flue, with brackets in front, supporting a string course of stone; fig. 3, is an elevation of the ventilator, shewing the shutters half open; *a*, is the boiler; *b*, *b*, *b*, the hot water pipe; *c*, *c*, the vapour tubes; *d*, *d*, the flues; *e*, the string course of stone laying over the flues; *f*, iron brackets which support the string course, the pipe, and

the coping in front; *g*, four inch brick work round the pit; *h*, *h*, the coping of the pit wall.

In reference to the ventilating apparatus, *i*, *i*, *i*, are the shutters; *k*, *k*, *k*, apertures in the brick wall, opposite to each sash of the hot house; *l*, *l*, *l*, the connecting rods for moving all the shutters simultaneously; *m*, *m*, loops through which the connecting rods pass; *n*, a rack at the end of the connecting rod, which is acted upon by a toothed segment *o*, upon the lever *p*; and *q*, is a pinion taking into a similar toothed segment at the opposite end of the lever *p*, which pinion is worked by a winch *r*, shewn in fig. 1.

*First, of Heating.*—The furnace and boiler may be placed behind any part of the back wall, at the option of the architect; he may also indulge his fancy in the direction of the fire flue, supposing at the same time that he is conversant in the erection of boilers and fire flues. And here I beg leave to observe, that gentlemen, out of nine cases in ten, had better employ men of experience in those matters, than become self-acting architects, as is too much the case at present.

The boiler may be of the usual size and form, suitable to the extent of space intended to be measured, by the fire flue and boiling water; but it must have its top firmly covered, and in the cover a light self-acting valve, very easily worked, that a little steam may be retained upon the surface of the water, which gives a little quicker motion to the water flowing through the pipe; I say pipe, for I have only one pipe in the whole apparatus: the upper aperture in the boiler to be placed six inches below the top, and from this point begins the pipe, of six inches bore, laid perfectly level, which will convey the water in any direction whatever, and to every part of the house, if desired; and the returning end of this pipe may be thrown into any part of the boiler near the bottom, say twelve inches below the upper aperture, which twelve inches of fall, it is scarcely necessary to observe, must be given by an elbow in the pipe, and this elbow may be placed in any part of its course, providing that the archi-

tect carefully observes to increase the length of the vertical tubes, hereafter described, should he place any between the elbow and the boiler, in the returning end of the pipe; that is to say, he must in all cases make those tubes as high as the top of the boiler.

The pipe may be composed of castings, either flat, square or round—say in four feet lengths, with an aperture in each, or every other casting, of the same size as the bore of the pipe, or any lesser aperture, if preferred, with a tube, standing as much above the top of the pipe, as the top of the pipe is below that of the boiler, to prevent the water from running over; these apertures give air and motion to the water, and serve at the same time to admit any quantity of vapour into every part of the house; and when they are not wanted to give out vapour, or when they emit too much, they may be covered or stopped up, at the discretion of the gardener, leaving, however, two or three open to give vent to the rotative motion of the water. The pipe may be placed various ways in the house, but I shall place mine, (as I intend building one for my own use), on the wall of the pit, as shewn in the section, supported by thin brackets of cast iron, resting upon a string course of stone above the fire-tiled flue, leaving the front open, and also a sufficient space round the pipe, that the heat emitted therefrom may diffuse itself through every part of the house; and over the pipe, and above the top of its tubes, I shall place the coping of the pit wall, which rests in front, upon the same brackets as the pipe, and at the back upon a four inch wall of brick, as shewn in the elevation and section; which coping will be thoroughly heated by the pipe and its apertures when the furnace is at work; and, when once heated, together with the heat of the pipes, will keep up the temperature of the house, after the furnace has ceased to work, a much longer time than any plan hitherto adopted.

Should the gardener wish at any time to give the vines a good steaming, by entirely filling the house with vapour, the above plan is well calculated for doing it, and requires nothing more than stopping the supply of water to the boiler, and reducing

the surface of water to two or three inches below the upper aperture in the boiler; and by keeping down the safety valve when the water is boiling, he may steam in any way, or in any part of the house he pleases, by keeping such vapour tubes open or shut, as best suits his purpose.

*Second, on Ventilation.*—The most general method of ventilating hot houses, is by opening the top and front sashes, which practice is attended with much trouble, and sometimes with danger to the vines, should sudden squalls of wind and rain come on unexpectedly when the sashes are open, and more particularly where only one gardener is kept.

The plan I propose to adopt, is to have an aperture through the back wall, twenty inches in height by fifteen inches in width, opposite to each sash, and these apertures are to be placed at the top of the house, whatever height the house may be, opening into a back shed, which is to extend the whole length of the hot house; two thirds of this shed in length must be left open in front, and the roof supported by pillars; the remaining parts, and both ends of the building, must be enclosed by a solid wall from the foundation to the height of the eaves, but both ends of the building, from the eaves upwards, must be left quite open, to give a free circulation of air; and, if thought necessary, a few old fashioned dormer windows might be made in the roof. In this shed the furnace and boiler will be placed; it will also answer as a store house for coals and other articles, and it is evident that the roof will check the sharp cutting winds from the north, so much complained of by gardeners, and against the plan of ventilating through the back wall of a hot house, without at all impeding a free circulation of air through these apertures into the hot house, when the sliding shutters, which I propose to adopt, are open.

These sliding shutters, which are intended to run in grooves at top and bottom, may be placed either in the hot house or in the back shed; and I propose that the whole of them, as per elevation, be connected together for ventilating one house, whether such house be large or small; so that if one is moved by

the machinery, when the winch is turned, the whole will open at the same time, and this can be done almost instantaneously, to any degree the gardener may require.

The method is very simple, and I presume will be easily understood, by referring to the elevation and section. I should recommend the shutters and machinery being fixed in the back shed, and let the axle of the pinion wheel extend through the wall into the hot house, and project two or three inches from the face of the wall, for the purpose of working the winch, and the gardender may, without going out of the house, regulate the shutters to any degree he pleases, almost in an instant; and should there be two houses adjoining to each other, two segments may be worked upon a common centre by the same pinion, right and left, with each of their connecting rods and shutters, by making the axle of the pinion to slide from one segment to the other, or by what is technically termed, throwing it in and out of gear; by this plan no sliding top sashes are required, and all their pullies, cords, weights, catches, &c. &c. are avoided, and the ugly appearance of their descending cords, weights, &c. are dispensed with.

I need scarcely mention, that the front sashes of a hot house may be worked upon the same principle as the back shutters, if required; and as the connecting rods are so small, they would be almost invisible, if they were fixed to the stiles of the shutters exactly opposite to the cross bars of the windows, and they would be out of the way of every thing; and the sashes would be worked with greater accuracy, and less danger than by hand, and the whole house ventilated, front and rear, in a minute of time, however large or small such house may be; and in almost any house the connecting rods might be made to pass the stems of the vines, without doing the least injury to any thing, or disturbing any pots or other things which may be placed on the sill of the windows.

The back shutters may be made of three quarters of inch boards; each shutter consisting of two boards, with a tongued

and grooved joint in the middle, and the connecting rods may be of the same material, two inches broad, screwed to the shutters, which will serve as battens to brace and strengthen them; so that in point of economy, nothing can be cheaper or less expensive than this plan of ventilating hot houses, and the plan is as well adapted for circular iron roofs as it is for the straight pitched ones.

If the connecting rods to the shutters were of thin wrought iron, rounded on the lower edges, instead of wood, running in loops, and not allowing the shutters to rest on the lower groove, they would work easier; and as the price of iron is reasonable, I think it preferable, and would recommend iron instead of wood.

I am, Gentlemen,

Yours, &c.

GEO. KNOWLES.

Ripon, Yorkshire.

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## ART. IV.—ON THE PROPOSALS FOR CHEAP PATENTS.

### *To the Editors of the London Journal of Arts.*

GENTLEMEN,—There appears to be an opinion among a considerable class of persons, that it would be desirable to have patents granted at a very cheap rate, on the ground that their high price acts prejudicially in checking and smothering invention. That high prices do in some measure act as a check upon the multiplication of patents is true, but it does not thence follow that it checks invention, for many inventions are better paid without a patent than they would be with one, and it is not desirable that inventors of every class and degree should take patents for their inventions. Therefore high price or some equivalent check, instead of being injurious, is quite necessary to restrain those from

rushing into the career of patentees, who are not provided with means for pursuing it with a prospect of advantage to themselves and to the community.

Useful inventors are of three classes; the first are men of genius, capable of producing important inventions that involve the entire projecting of new machines or remodelling of existing ones, and the organization of new or complicated processes and systems of working. These are very few.

The second are men who have not so extensive a scope of imagination and intellect as to project new systems or great changes, and to organize the means of effecting them, but who are capable of making marked improvements upon existing systems and machinery, or partial changes in them. This class is considerable.

The third class is made up of men of small imagination, who are not capable of any great originality of thought, but who have a certain ingenuity which they can apply to the things that come within the range of their observation, and possess a tact for correctly and accurately executing that which they conceive. Their province is to improve in detail, to give a finish to the detached parts of the extensive combinations formed by superior minds, and to fill up the chasms that occur frequently in the plans of the greatest inventors. Happily this class is immense, being spread thickly over the whole body of mechanics, from the manufacturer and engineer down to the lowest workman; such men constitute expert mechanicians, who are never at a loss for expedients for overcoming the practical difficulties of detail that occur in their business, and are perpetually making trifling inventions which they require for immediate application.

Now the first and second of these classes are the only ones that do much good, or gain much by taking patents for their inventions, because it is only those two classes who produce inventions having a sufficiency of originality or quantity of invention, to make them clearly definable as distinct property, and to give them an inherent value individually.

The third class are restrained from taking patents for their

inventions, some because they know well that their inventions are not worth patents, and others who are too vain or ignorant to be aware of that fact, because of the high cost of patents. And it is well that they are restrained, for their inventions are seldom or ever worth patents in the hands of poor men, even if those patents could be had for nothing; because in general no one invention of that class would give, individually, an additional value worth notice to the machine or process to which it is applied.

The reward which inventors of this class obtain, is in the superiority which they gradually acquire over their competitors in business, and the consequent increase of employment or profit, and that is likely to be fully equivalent to the value of their inventions.

Trifling inventions do sometimes rise into value as patents, and become very beneficial to the public, in the hands of manufacturers who have money and connection. But then that value is not the inherent value of the inventions themselves, which would have been as nothing in the hands of poor men, but it arises from their being made the medium for a beneficial application of capital, and the chief merit due to the inventors is not for their skill as artists in having made the invention, but for their activity and energy as tradesmen.

Of this there are several examples. For instance, Bramah's pen-holders, Mordan's pencil-cases, Felton's knife-sharpeners, &c.

In these cases the inventions themselves were trivial, and probably neither of those patents, if offered for sale in the beginning, would have brought £.50, because the chief profit to be made by them was not due to any thing the invention itself possessed, but to the capital and skill and activity which the manufacturer would devote to making and keeping a trade, for which the invention and patent were only a ground-work.

A poor man might have had either of those patents, and never have made any thing by it, even if the patent had been given him for nothing, but they are all said to have grown into considerable trade in the hands of the individuals who held them.

I come now to the principal pointon which the advocates of cheap patents hold themselves strong, viz. the case of a man of real genius, great imagination, and vigorous mind, who having made a valuable discovery, is unable from poverty to procure a patent, and is therefore obliged either to give up his invention for nothing, or to bury it for ever in his own mind. Such cases may occur, but they are rare.

In general, if the author of an important invention is found among the ranks of the poor, doubtless he will have more difficulties to cope with than if he were rich, but if he be really a superior man, and of a cast to produce inventions that are worth cultivation for their own strength, the price of a patent will not prevent his invention from being brought forwards, because he will find wealthier men to assist him. And if he has not enough address and skill in the world to do that, how will he have enough to force his invention into use, against opposition and difficulties of every kind, even should you give him a patent for nothing, and a bonus besides? I marvel much that this point should still need argument, and in truth it is waste to argue about it, when we have examples that set the question at rest.

Some of our greatest inventors have been absolutely poor men, and others, if not poor, were at least both unwilling and unable, in the beginning of their career, to risk themselves the price of a patent, and the expenses of subsequent trials; and cases are daily occurring of manufacturers paying the expenses of patents and experiments for their workmen, for a share in the patent right of an invention they have thought valuable. A considerable portion of the patents taken out in the manufacturing districts, are on this footing, which shews that the difficulty of union between capitalists and inventors has been much exaggerated.

After all, the advocates of cheap patents make a much more mighty stumbling block of this first cost of a patent than it really is, and they seem to consider it as the great impediment to invention; which being removed, invention would flourish with a luxuriance hitherto unseen. Now the real cause which under the pre-

sent law represses invention and makes capitalists loth to speculate in inventions, is the uncertainty which reigns through every stage of a patent, from the beginning to the end; uncertainty, first, whether the invention will answer, and secondly, whether the patent will stand the brunt of an action at law, through which ordeal it will surely have to pass, so soon as it has become profitable to the inventor. Both of these points can only be settled at great expense, and it is the fear of that expense, and not the first cost of a patent, which deters men from taking up the inventions of others and ought to deter all prudent men of small means from attempting to take out patents and work them at their own risk.

If patents were given for nothing, many poor inventors would injure themselves by neglecting their proper occupations for the imaginary rewards held out by a patent, and very few would be any the forwarder for it, for the simple reason that forcing inventions into use, does require and will require under any law that can be contrived, money as well as invention, and therefore those who have not money should not undertake it.

To sum up, the men whom the law should invite to devote themselves to invention and to take patents are, first, those who have skill to produce considerable inventions, and who have either themselves money to try their inventions and bring them to bear, or address to induce richer men to join them; and, secondly, those who if they can only produce trivial inventions, have means and commercial skill to found trades upon them.

But those who have small invention and no money, ought to be discouraged from taking patents by check of some kind.

That check is now high price, and if it be removed some, other must be applied in its place.

I am, Gentlemen,

Your obedient servant,

R. S.

# Recent Patents.

*To* WILLIAM CLUTTERBUCK, *of Ozlebrook, near Stroud, in the County of Gloucester, Shear-maker, for his having invented certain Improvements in the Shears used for cutting or cropping of Woollen Cloths, and other Fabrics requiring shearing.*—[Sealed 21st Nov. 1829.]

SPECIFICATION.

"MY improvements in the shears used for cutting or cropping woollen cloths and other fabrics, apply to the old construction of hand shears, or to those employed in the machines called Harmers; which improvements consist, first, in a new shape or form given to the edge of the uppermost blade of the shears, commonly called the runner blade; second, in an improved construction and adaptation of springs connecting the blades, in place of what is commonly called the bow of the shears; and third, in a new mode of adjusting the set or position of the edges of the blades of the shears to each other.

"The new form given to the runner blade, as first above mentioned, is intended to prevent the injury frequently sustained by the scraping of the edge of the runner blade of the old shears, upon the face of the cloth (generally termed beating), which injury is caused by the edge of the runner blade (standing nearly perpendicular to the bed) pressing or rubbing up the face of the cloth after it has given a cut, and is in the act of springing back or returning.

"In my improved shears, I make the edge or cutting part, commonly called the plank of the runner blade, as

nearly horizontal and coincident with the bed on which the cloth is placed as I conveniently can, consequently when the blade springs back off the ledger blade, after having cut or cropped the pile, it presents to the face of the cloth a nearly flat smooth surface, and not the cutting edge, as heretofore. This will be fully understood by referring to the drawings (see Plate V.) in which fig. 4, is a section taken through the two blades of the shears, in a vertical direction ; *a*, is the fixed or ledger blade, and *b*, is the moveable or runner blade, shewing the bent shape of the blade, and the cutting edge at *c*, which being seen in the following figures of the drawings, require no further explanation, as the form must be obvious by inspection.

" The second head of my improvements consists in the construction and adaptation of springs to the shears in a new way, one of which is a coiled spring to be applied at the shanks or ends of the blades, and the other a mode of attaching bow springs to the upper sides of the blades, in place of the springs or bows commonly affixed to the shanks, by which improved construction of spring, I am enabled to take apart the blades of the shears when required, for the purpose of repairing or grinding, without injury to the springs, or heating the bow, which must be the case in grinding the ordinary shears. Figs. 5, 6, 7, and 8, are several representations of the improved shears, with the new construction of coiled spring, which I purpose to place at the shanks or ends of the blades ; *a*, is the ledger or fixed blade, with its shank piece *e*, and leaf *f* ; *b*, is the runner or moveable blade, with the coiled or convolute spring *d*, *d*, extending from its shank, and which convolute spring is to be firmly screwed or bolted to the shank *e*, of the ledger blade, by connecting the two leaves *f*, together, as at fig. 5, which is a top view

of the shears, the two blades being put together ready for working. Fig. 6, is a side view of the same. Figs. 7, and 8, are top views of the blades, when taken apart.

" The other method, viz. that of applying bow springs to the backs of the blades, is shewn in figs. 9, 10, 11, and 12, in which fig. 9, is a plan or horizontal view of the shears, with their springs attached, ready for work. Fig. 10, is an end view of the same; fig. 11, a view of the face of the runner blade, shewing the mode of attaching the springs thereto, and fig. 12, is a vertical section, taken across the shears; *a*, is the ledger blade; *b*, the runner blade; *c*, *c*, two bent springs, attached at one end by screws or bolts to the top side of the ledger blade, and at the other end by an adjustable nut or screw at the front of the runner blade.

" By these modes of placing the springs, the inconvenience of the bow of the old shears is obviated, and the shearing frame consequently takes much less room, and I am enabled also to operate upon the cloth nearly the whole length of the blades at one cut.

" I propose to communicate the required motion to the runner blade of the improved shears, shewn in figs. 9, and 10, from a small crank on the frame or carriage of the shears, which is to be actuated by an endless band from those working parts of the frame that give motion to the crank of the ordinary shearing machines. From the crank on the side of the carriage of the shears, the motion may be communicated by the connecting rod *h*, attached at one end to the crank, and the other to the lever *i*, on the end of the shaft *j*, which works in bearings in the ends of the arms or pieces *k*, *k*, projecting from the upper side of the ledger blade. Upon the shaft *i*, is the small drum *l*, over which is passed the strap or band *m*, and connected at the other end in the usual way to the lever or " bob" *n*,

which bob or lever is also connected to the ledger blade *a*, by the strap *o*, and adjusting screw *p*. It will be seen by this arrangement of the parts, that the blades may be made to cut nearly from end to end, as no part of the shears comes in the way of the bed or the cloth.

" In order to prevent the runner blade from springing off the ledger blade, I cause the hooked part of the adjusting stop *p*, on the arm *k*, to be brought up to the back of the runner blade, which will prevent the blade springing too far back.

" The third head of my improvement, viz. the manner of adjusting the set of the blades of the shear, will be understood by reference to figs. 6, 10, and 11.

" In fig. 6, it will be seen that on the shank *l*, of the ledger blade a link or ring, *r*, is shewn with the end of a lever *s*, bearing in it also; on the shank is the hook of the adjusting screw *t*, which passes through a hole in the lever *s*, and by screwing up the nut on the screw, the strain on the lever and shank of the blade will slightly bend the shank, and by that means alter the set of the runner blade; which by this contrivance may be adjusted to the greatest nicety, without giving any strain to the blades or springs. The manner of adjusting the set of the shears, having the springs on the top of the blades, is shewn in figs. 10, and 11, where the end of each spring is connected to the runner blade by a screw bolt *u*, working in *a*, slot in the blade, with an arm *v*, extending from the side of the spring, into which the worm of the screw *g*, works as a nut; the screw being supported and kept in its place by the frame *w*; by turning the screw *g*, the blade may be raised or lowered and the set of the shears adjusted at pleasure.

" Another plan of adjusting the springs, which may be used with the former with good effect, is shewn in the ver-

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tical section, fig. 12, where the spring is seen with its end in the socket $x$, fastened on the upper side of the ledger blade, and by turning the adjusting screws $y$, $z$, the spring may be moved backward or forward, and by that means the blade adjusted.

"As there are some parts herein described for the purpose of rendering my invention better understood, which are not new, and which I do not intend to claim, I wish it to be particularly observed, that my invention consist, first, in the new shape of the runner blade as described, by which a flat surface is presented to the cloth when off the ledger blade.—Secondly, in the new constructions or forms of springs, as described and shewn in the figures, and in the mode of applying the same to the blades of the shear.—And lastly, in the manner of adjusting the set of the shear blades, as above described."—[*Inrolled in the Rolls Chapel Office, January*, 1830.]

Specification drawn by Mr. Newton.

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*To* GEORGE STRAKER, *of South Shields, in the County of Durham, Ship Builder, for his invention of an Improvement in Ship's Windlasses.*—[Sealed 25th July, 1829.]

THE object of this improvement is to work a ship's windlass, with greater ease and expedition than upon any of the plans at present in use, and consists in a certain piece of mechanism attached to the windlass and the employment of a peculiarly formed handspike to work the same.

SPECIFICATION.

"PLATE V. fig. 13, is a perspective view of the windlass, fitted with my said improvement on the starboard or sheet

anchor side, but it may be as well here to observe, that it may if required be equally well fitted to the larboard side, or to both if thought necessary; *a* is the paul bit; *b*, is the bit head; *c*, *c*, is the windlass barrel; *d*, is a cogged band or rack round the windlass barrel, and *e*, is a pinion working into the said rack; *f*, is the axle on which the said pinion is fixed, and is supported at one end by the bit head, and at the other end by the paul bit; *g*, *g*, *g*, *g*, are four circular metal plates with ratchets or teeth cast on or rivetted to one side of each of them, as at *h*, *h*, *h*, *h*, in the auxiliary detached figs. 14 and 15, and which shew the improved parts, on a larger scale. These ratchets are fixed firmly in pairs on the axle *f*, about four or five inches asunder; the teeth on each plate, must be set exactly to correspond; and it is then by means of a peculiarly shaped handspike hereinafter described, that I act upon these teeth or ratchets, forcing round the pinion *e*; and thus act with great power upon the rack *d*, which of course turns the windlass barrel round.

Fig. 16, is a representation of the peculiarly formed handspike: the lower part from the point marked *m*, is made of iron, and is forked at *l*, and is furnished with two shoulders, one on each side, as at *n*; now if one of this sort of handspikes be introduced between each of the two plates, *g*, *g*, which form a pair, the fork *l*, being allowed to bestride the axle *f*, the shoulders will rest upon and act against the ratchets *h*, on both sides, and if these handspikes be only worked up and down, like a pump brake, they will force the axle *f*, round, and thus turn the barrel of the windlass, while the loss of time occasioned by removing the handspike of the old form when hove down, and hitting the hole on the upper square again at every fetch, will be avoided.

"It is evident that this improvement of the ratchet plates

and forked handspikes is equally applicable to the main axle of the windlass barrel, and to the axle of the pinion *e;* and it may be proper to observe, that the ratchet plate or wheel may be made single and worked by a handspike placed astride of it.

" Now whereas, my said improvement, when applied as here shewn to the axle of a pinion, (which I consider the most efficacious mode of applying it) may be made to ship or unship in the bearings of the axle, or to slip in or out of gear with the pinion at pleasure. And whereas the ratchet plates may be made of cast-iron, or of wood strapt with iron, or otherwise. But whereas, I claim as my invention, the ratchet plates marked *g*, and *h*, whether applied to the axle of the pinion, as here shewn, or to the main axle of the windlass barrel, as before mentioned; and also the forked handspike to be used therewith, which two articles together, used for the purpose of giving additional power to a ship's windlass, constitute my said improvement and invention, and such my invention being, to the best of my knowledge and belief, entirely new, &c. &c." —[*Inrolled in the Inrolment Office, September,* 1829.]

Specification drawn by Mr. Rotch.

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*To* William Church, *of Heywood House, near Birmingham, in the County of Warwick, Esq. for certain Improvements in and upon Instruments for sharpening Knives and other Edge Tools, and in the Machinery or Apparatus for manufacturing the same.*—[Sealed 15th October, 1829.]

SPECIFICATION.

" My improvements in or upon instruments for sharpening knives and other edge tools, and in the machinery or apparatus for manufacturing the same, consists in the

adaptation of two or more peculiarly formed file cut pieces of steel, which pieces of steel may be conveniently mounted on the handle of a fork, or other handle, or in any other way that circumstances may require.

" Plate VI. fig. 1, is a face view of one of the said pieces of steel, shewing several indentations, and also the file cut surface, and the aperture through which the shank of the handle passes. Fig. 2, is an edge view of the same. Two of these steel pieces, formed as shewn in the drawing, having indentations made exactly to fit each other, are placed nearly in connection in fig. 3, and joined together in fig. 4; both of these figures representing the pieces in section.

" The two pieces of steel, when thus united, may be confined by passing the shank of an ordinary fork through them, when by resting against the boss the pieces are secured firmly between it and the handle, as shewn at *a*, *a*, in figs. 5, and 6, by the ordinary means of attaching handles to table forks.

" I form these sharpeners, by cutting dies, of whatever dimensions may be necessary, out of thin sheet steel, and give them the file surface by means of dies in a stamping press, and afterwards harden them in the ordinary way of hardening steel tools.

" When I employ the instrument as above described to sharpening scythes and such like tools, I set them in guards, where they are secured and held together by a screw, as shewn at fig. 7.

" It is to be observed, that in the drawing, figs. 1, 2, 3, and 4, represent the sharpeners as circular pieces, on a scale sufficiently large for sharpening scythes; but when the instrument is to be applied to a table fork, it should correspond, or nearly so, with the size and shape of the ornamental part of the shank of the fork, whatever that may be.

" The apparatus for manufacturing these said improved sharpeners, consists of peculiarly formed conical dies. These dies are cut with indentations corresponding and fitting into each other, in order to cut and mould the pieces of plate steel into the required forms, for producing the sharpening tools above described. The conical part of the lower or female die is file cut, by means of which the face of the steel disc is similarly impressed; the upper or male die is formed as its counterpart, excepting the file surface.—[*Inrolled in the Rolls Chapel Office, April,* 1830.]

Specification drawn by Mr. Newton.

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*To* JOHN BRUNTON, *of West Bromwich, in the County of Stafford, Engineer, for Improvements in the Apparatus for manufacturing Coal Gas and Coke; and also Improvements in the Method of arranging such Apparatus.*—[Sealed 2d October, 1828.]

SPECIFICATION.

" My improvements consist, first, of retorts made of cast iron, and not cased or lined with fire clay; of a conical shape, for the purpose of facilitating the discharge of the coke at the larger end, when the retorts are fixed in a vertical position with that end downward; thereby saving much labour and inconvenience in the discharge thereof, and also preventing the injury which is occasioned by the breaking and reducing to powder, a portion of the coke attendant upon the ordinary method of discharging retorts. Secondly, in the adaption of a perforated pipe, of a conical or other convenient shape to the retorts, for the purpose of enabling the gas to escape freely through the mass of

coal when it is of such a nature as to make it desirable to facilitate the escape of the gas by some such means. Thirdly, in an improved furnace or fire-place door or mouth. Fourthly, in a contrivance for preventing the breaking or disturbance of flanches or joints by the expansion and contraction of the hydraulic main, or the pipes leading thereto. Fifthly, in improvements in the arrangement of various parts of gas apparatus; which arrangements, and also the improvements in the various apparatus, are set forth in the annexed drawings and the explanations thereof. (See Plate VI.)

"Any convenient number of my retorts may be connected together or placed in beds; but I have in my drawings, confined myself to a set or bed of twelve retorts, considering that that number will be generally useful and advantageous.

"The same letters or characters refer to the same parts in each of the drawings, and illustrate each other.

"Fig. 8, is a ground plan of a bed or set of twelve retorts; fig. 9, shews the mode of connecting the mouth pieces of the retorts; fig. 10, is a cross section of the apparatus, taken vertically; and fig. 11, a sectional plan of the upper end of fig. 10, taken at the dotted lines.

"Fig. 12, is a general elevation, shewing the thoroughfare under the beds of the retorts for the purpose of discharging, &c.; fig. 13, exhibits the bottom cover or stopper of a retort; fig. 14, the perch or support of the coal within the retort, and fig. 15, a measure that may be used in charging the retorts.

"The ground plan, fig. 8, represents a double bed of retorts, containing six in each, which are marked *a*, *a*: A, is a wall of fire-bricks passing between the two beds, and is supported by a sleeper K, as shewn in fig. 10; B, B, are two furnaces heating the two beds of retorts through the

flues C, C, C, C, which passing along the outside of the retorts, unite and return between them into the main flue leading to the chimney, as is shewn more distinctly in fig. 11.

"Fig. 9, shows the manner in which the mouth pieces are connected together, viz. by means of bolts and screws passing through the flanches, *d*, *d*, *d*, *d*. Two flanch pieces, *e*, *e*, extend beyond those of the retorts, resting on the piers, E, E, the outer part of which flanches marked *q*, form supports for the bottom of the flues.

"Fig. 10, is a cross section taken in the dotted line, fig. 8, shewing its elevation, with stand, pipes, hydraulic main, &c.; A, is the wall dividing the two beds of retorts; D, D, are the two outside walls or arches connecting the two piers E, E, (see fig. 12). Under these arches are two walls F, F, supported upon sleepers G, G, and containing four stoppers, T, T, T, T, for the convenience of withdrawing, in order to clear out the flues. The four conical retorts are marked *a*, *a*, *a*, *a*, the lower ends of which are shewn with their covers in various positions; *j*, the lower cover or stopper of a retort, (seen more distinctly in fig. 13). The mode of attaching it to the mouthpiece is shewn, but I do not claim any particular mode of doing it; *f*, a perch or support for the coals within the retort, which is attached to a rod *g*, and passes through the cover *j*, and is secured at the proper height by the screwed cap *h*.

"The perch is shewn more distinctly in fig. 14; *n*, an upper cover, which when placed on the top of the retort and luted in the usual manner, is kept down by the pressure of the lever and weight *o*, upon the centre of it; but which in case of a stoppage in the pipes, allows it to act as a safety valve and thereby prevent mischief. The end of the lever opposite to the one carrying the weight is attached to the support *p*; *b*. a perforated pipe inserted into

the retort for the purpose of facilitating the escape of gas when generating from small coal; it is kept in its place at the bottom by the perch *f*, and at the upper end by the cross bar *m*; H, H, H, H, figs. 10 and 12, represent the furnace doors; the entrance to each furnace consists of a frame and two doors meeting in the middle and there forming an angle, as shewn in the drawings, the one door opening upwards and the other downards.

" The lower door is opened when the fire-place wants cleaning; the upper door is opened for the purpose of introducing fuel, a portion of which lies against the door, preserving them in a great degree from the action of the fire, and at the same time preventing the escape of a portion of heat; w, the ash pit, in which is placed the water trough x; I, I, I, I, are cover titles resting on the upper flanches c, c, &c. and upon the walls A, and D.

" To prevent any expansion of the hydraulic main, or the pipes leading thereto breaking or disturbing the flanches or joints connected therewith, instead of supporting the hydraulic main in the usual manner by means of an inflexible column or standard, I interpose or place between the hydraulic main and the upper part of the column or standard, a crutch or bearer, the lower part of which is allowed to press upon one end of a compensating lever, to the other end whereof a weight is attached. These levers and weights are so proportioned to the weight of the hydraulic main as to allow the crutch upon the upper part of which the hydraulic main rests, to move up and down with it, and thereby prevent the inconvenience which might otherwise arise.

" As a further means of preventing injury from the expansion of the pipe, I fix to the hydraulic main a requisite number of dip pipes, each of which descends about three inches into the liquid contained in the main; and through

these dip pipes to about the same depth in the liquid, the H, pipes are passed so loosely as to allow the liquid to form an hydraulic joint between them; and therefore render a stiff and inflexible joint of the hydraulic main and the pipes leading into it unnecessary, and allow them to expand and contract by a change of temperature without occasioning any inconvenience.

"In the drawings, figs. 10, and 12, *r*, is an aperture in the upper end of the retort through which the gas passes into the stand pipes; *s*, a stand pipe; *t*, the pipe usually called H, pipe, leading from the stand pipe *s*, to the hydraulic main; *a*, a branch and bonnet in the middle of the pipe *t*, for the convenience of cleaning it; *w*, the hydraulic main; *x*, a dip pipe fixed to the main, and through which the end of the pipe *t*, passes so freely as to allow the liquid to form an hydraulic joint between them.

"The particular parts I have now described, and the advantages of my arrangement of them, will be evident, from an examination by any person of ordinary attainments, of the figs. 10, and 12. The thoroughfare under the beds of retorts for the purpose of discharging them with considerably less labour (and with less injury to the coke) than by any other means: together with the furnace mouths H, the ash pit W, and water trough X, are distinctly shewn in fig. 12. The retorts with their covers, and the mode of securing the upper cover, so as also to make them serviceable as safety valves, is distinctly shewn in fig. 10. The hydraulic joint connecting the hydraulic main and pipe leading into it, and also the crutch and compensating lever, are fully illustrated by the figures 10, and 12.

Fig. 15, the vessel which I use for charging the retort, is made of proper capacity for containing the charge of one retort, and when placed over it, by withdrawing a

sliding bottom, which is fitted to it for the purpose, the contents are emptied into the retort.—[*Inrolled in the Inrolment Office, April,* 1829.]

Specification drawn by the Patentee.

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*To* Angelo Benedetto Ventura, *of Cirencester Place, Fitzroy Square, in the County of Middlesex, Professor of Music, for his having invented certain Improvements on the Harp, Lute, and Spanish Guitar.* —[Sealed 21st. February, 1828.]

The subject of this Patent is a newly constructed musical instrument with strings, combining the principles of the harp, lute or lyre, and the guitar in one instrument, by which the treble strings may be stopped upon finger boards, for the purpose of producing the higher notes of the musical scale.

The instrument may be constructed in various ornamental forms: that shewn in Plate VI. at fig. 21, is principally recommended. The middle of the instrument has the ordinary strings of the lute, but on the side are the finger boards and strings of the guitar, and additional strings and finger boards for producing the highest notes.

It will be unnecessary to describe the construction of the instrument further, as the figure above alluded to renders it perfectly evident, and as to the method of playing upon it, that may be readily conceived to be in a great degree similar to the fingering of the lute and the guitar of the ordinary constructions. The peculiar feature of novelty claimed, consists in the combination of the two instruments in one.—[*Inrolled in the Inrolment Office, August,* 1828.]

*To* JOHN TUCKER, *of Hammersmith, in the County of Middlesex, Brewer, for his having invented or found out an exploding Shot or Projectile.*—[Sealed 2d Nov. 1829.]

THE subject of this invention is a sort of bomb shell or rocket, to be shot from a cannon, and which is intended to explode when it falls or comes in contact with any obstruction. The bomb or rocket consists of a hollow iron vessel, of an egg form, which is to be filled with gunpowder, and in connection with the powder there is a fusee or match which ignites by percussion, caused by the recoiling blow of a bolt or piston, placed loosely within the hollow cylindrical tube which constitutes the tail of the rocket, with wings on the outside to guide it. The Patentee describes the invention in the following words:—

"My invention consists in a projectile, which bursts by means of percussion powder, and which powder receives the necessary blow to cause it to explode, from a loose bolt, which when the projectile is passing through the air, remains at the hinder part of a tube made to receive it, but the instant the projectile meets with any sudden check or impediment, such as striking against a target or the object it is aimed at, the bolt rushes to the forward end of the tube, where the percussion powder is placed with such violence as to cause an immediate explosion.

"Plate VI. fig. 16, represents a longitudinal section of my said projectile; *a*, is the head or magazine; *b*, is a screw plug, through which the magazine is charged with powder; *c*, *c*, are two of the fans or wings to guide the projectile, or keep it straight, on the principle of the feathers of an arrow; *d*, *d*, is a long hollow space or chamber, cast in the hinder part or tail of the projectile, to receive and keep steady the tube *e*. This tube is screwed

in the projectile at *f*, and contains the loose bolt and percussion powder, as shewn more clearly in the next figure.

"Fig. 17, is a section of the tube *e*, supposed to be unscrewed at *f*, drawn out of the projectile; *g*, is the loose bolt or hammer which gives the blow on the percussion powder; *h*, is a screw plug, one end of which forms a nipple *i*, on which the percussion powder is placed or tied. In this figure it is represented as put in a small bag, and tied over the nipple; *j*, is a piece of quick match, drawn through two holes pierced in the tube *e*, to serve as vents.

"It will be observed, that the screw plug *h*, has two screw threads cut on it, *k*, and *l*; the former screws into one end of the tube *e*, and the latter into the magazine or end, *f*, of the projectile; *s*, is the end of the tube closed.

"In order to prepare this projectile for use, the bolt, percussion powder, and quick match should be arranged, as shewn in fig. 17, and then screwed into the projectile, as shewn at fig. 16, which is a section of fig. 18, the front end being represented at fig. 19, and the back end at fig. 20.

"The screw *b*, should then be removed, and the part *a*, filled, should be replaced, and the projectile being then put into a canvass case, tightly fitted, is ready to be put into the gun to be shot off. It is only necessary to observe, that the feather end should be next to the powder in the gun.

"It may be fired from an ordinary cannon like other shot, and the effect will be as follows; while the projectile is passing through the air, the bolt *g*, will remain at the hinder end of the tube, having of course the same impetus as the other parts of the projectile, but the moment the impetus of the other parts receives a check by striking against the object aimed at, the impetus gained

by the bolt, will carry it forward along the tube *e*, to the nipple *i*, where it will bring up or strike with such force as to cause the fulminating powder to explode and communicate with the gunpowder in the part *a*, which will of course instantly burst to pieces in various directions.

" It is scarcely necessary to state that the fusee or quick match is merely to keep the gunpowder in the chamber or head *a*, from passing into the tube *e*, through the vent holes.

The Patentee in conclusion states, " I claim as my invention, an exploding shot, or projectile, the explosion of which is caused by fulminating powder being struck by a bolt or hammer, which derives its force from the impetus given to the missile by firing it from the cannon, but the impetus of the bolt continues after that of the other parts of the projectile has ceased or is checked.—[*Inrolled in the Roll's Chapel Office, April,* 1830.]

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*To* JAMES SOAMES, Jun. *of Wheeler Street, Spital Fields, in the County of Middlesex, Soap Maker, for a new preparation or manufacture of a certain material, produced from a vegetable substance, and the application thereof to the purpose of affording light and other uses.*—[Sealed 9th September, 1829.]

THE subject of this Patent is a mode of preparing cocoa nut oil, for the manufacture of candles, in which operation an oil is extracted for burning in table lamps, and the materials when so prepared are be found much purer than common tallow or sperm oil, and to afford a more brilliant and colourless light than any other oleaginous material hitherto applied to the purposes of illumination. The following are the words of the

SPECIFICATION.

" MY invention or discovery consists in preparing or manufacturing the material or substance commonly called

cocoa nut oil, by subjecting it to the process of hydraulic or other suitable pressure; by which process I separate the elaine, by which I mean the more fluid part from the stearine, by which I mean the more solid part, and thereby obtain two products; one fit to be applied to the manufacture of candles, and the other to burning in ordinary lamps, and other purposes.

" I take the substance called cocoa nut oil, in the state in which it is imported into this country, and submit it to a strong hydraulic pressure, (the size of press I use being of ten-inch ram), having made it up in small packages, three or four inches wide and two feet long, and one or one and a half inches thick. These packages are formed by first wrapping up the said substance in strong linen cloth, of close texture, and then in an outward wrapper of strong sail cloth. The packages are to be placed side by side, in single rows, between the plates of the press, allowing a small space between the packages for the escape of the elaine.

" The temperature at which the pressure is begun, should be from about 50 to 55 degrees, or in summer as nearly at this range as can be attained, and the packages of the said substance intended for pressure, should be exposed for several hours, previously to about the same temperature: when the packages will no longer yield their oil or elaine freely at this temperature, it is to be gradually raised, but it must at no time exceed 65 degrees, and the lower the temperature at which the separation can be effected, the better will be the quality of the oil expressed.

" When the packages are sufficiently pressed, that is when they will give out no more oil, or yield it only in drops at long intervals, the residuum in them is to be taken out and cleansed or purified, which I do by melting

it in a well tinned copper vessel, which is fixed in a outer vessel, having a vacant space between the two which is closed at the top, and into which steam is admitted, and the heat is kept up moderately for a sufficien time, to allow the impurities to subside; but if a still highe degree of purity is required, it is necessary to pass through filters of thick flannel lined with blotting paper.

" Having been thus cleansed or purified, it is fit for the manufacture of candles, which are made by the ordinary process used in making mould tallow candles. Having thus disposed of the stearine, or what I call the first product, I proceed with the elaine or oil expressed from it, and which I call the second product, as follows; that is to say, I purify it by an admixture, according to the degree of its apparent foulness, of from one to two per cent. by weight, of the sulphuric acid of commerce, of about 1.8 specific gravity, diluted with six times its weight of water; the whole is then to be violently agitated by mechanical means, and I prefer for this purpose the use of a vessel constructed on the principle of a common barrel churn; when sufficiently agitated, it will have a dirty whitish appearance, and is then to be drawn off into another vessel, in which it is to be allowed to settle, and any scum that rises is to be carefully taken off. In a day or two, the impurities will be deposited at the bottom of the oil, which will then become clear, or nearly so, and it is then to be filtered through thick woollen cloth, after which it will be fit for burning in ordinary lamps, and other uses; sharpening instruments on a hone, oiling clocks, and the like.

" Now the process of separating the elaine from the stearine by pressure, in manner aforesaid, has never before been applied to the substance called cocoa nut oil and consequently no product has heretofore been obtained

ereby from that substance fit for being manufactured to candles, in the ordinary way, or for being refined by ıy of the usual modes, so as to burn in ordinary lamps, oth which objects are obtained by my method of preparng or manufacturing the said substance.

" And I therefore hereby claim as my invention or dis-ɔovery, the manner hereinbefore described of preparing or manufacturing the substance called cocoa nut oil, by hydraulic or other suitable pressure, and the application of the products obtained thereby; one to the purpose of making candles, and the other to the purpose of burning in ordinary lamps, without the necessity of applying the conductors of heat, and other contrivances now adopted, when cocoa nut oil in its ordinary state, as imported, is used for burning, and also to other uses."—[*Inrolled in the Inrolment Office, March,* 1830.]

We have seen some of the candles made from the above material, and from our own observation are enabled to state, that they are a very superior article. The light produced is more brilliant than from the same sized candles made of tallow; the flame is perfectly colourless, and the wick remains free from cinder, or any degree of foulness during combustion. There is no smoke, and not the slightest disagreeable odour, while the candle is burning, and very little when extinguished.

These candles are much whiter than those made of the purest tallow, and appear to burn longer, and extremely even, without any appearance of guttering, although exposed to drafts of wind, or carried up and down stairs. The retail price of them, we understand to be ten shillings per dozen pounds, which, though higher han tallow, will no doubt come into very extensive use om the circumstance of their great superiority. We

have not seen the oil burning, but understand that it possesses the same estimable properties as described to belong to the candle, and is not more expensive than sperm oil.—EDITOR.

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*To* JOHN M'LEOD, Esq. *of Westminster, in the County of Middlesex, Surgeon of the Madras Establishment, for his having invented Improvements in preparing or manufacturing certain substances so as to produce Barilla.*—[Sealed 10th August, 1829.]

THE Patentee being in the East Indies, and accustomed to the pursuit of chemical science, observed certain substances produced in that country, and considered to be of little value, which he conceived to be capable of useful application as a substitute for barilla; and having made the necessary experiment, he was convinced of the fact; and has therefore taken this patent for the application of his discovery, and the method of preparing the material: which is described in two or three lines toward the close of the specification; commencing with a concise history of the circumstances which led to the discovery which he gives in the following words:—

"Travelling along the coast of Coromandel, at certain seasons of the year, the ground in many places is observed to be covered with a white efflorescence, which on examination will be found to consist chiefly of muriate and sesqui-carbonate of soda. These substances are collected by the natives and used by them for a variety of purposes.

"The ground on which this efflorescence appears, is never covered with verdure. The soil is a deep sand with

a mixture of clay, carbonate of lime, &c. The clay contains, as it generally does, some oxide of iron, of which whole fields on the west side of the great Pulicate Lake, forty or fifty miles north of Madras, are of this description.

" Carbonate (sesqui-carb.) of soda is met with only on the surface, and it is found in greatest abundance a few weeks after the periodical rains have ceased. The natives begin collecting it in March, and continue to do so during the hot weather that succeeds. The saline crust is scraped from the surface, mixed with sand and clay, washed in water so as to separate some of the insoluble matter, and the watery solution is evaporated to dryness. The residiuum thus obtained, is the karum of the bazaars, and is the only preparation hitherto made or used in India of these materials.

" This karum contains from four to six or eight per cent. of soda, and the rest consists of carbonic acid, sand, clay, muriate of soda, decomposed vegetable matter, and occasionally other impurities. Various attempts have been made to introduce this substance into our manufacturies, and with this view consignments of it have at different times been sent from Madras, but the nature and quantity of its impurities effectually excluded it.

" Some years ago it occurred to me, that if it were divested of some of its insoluble matter, and submitted to the action of fire so as to free it from a portion of carbonic acid, decomposed vegetable matter, water, sulphur, and other volatilizable impurities, it might become an article of considerable importance. I conceived that if the karum were treated in this manner, and fused in a reverberatory or other furnace, it might be converted into a substance resembling barilla, which would be found a perfect

substitute for that article. This idea I soon after put in practice, but my first attempts were unsuccessful.

" The materials above mentioned being fused in a reverberatory furnace, became a mass of green glass, in consequence of their containing a quantity of silecious matter, of which they had not been sufficiently divested. It therefore became necessary to get rid of this admixture by more careful solution and evaporation to dryness, as already mentioned. These operations being performed with sufficient care, the residuum underwent the action of fire without any sensible portion being converted into glass, and the fused mass being withdrawn and cooled, resembled very fine barilla in most of its essential properties; and in fact passes current in the London and Antwerp markets as barilla of a superior quality."—[*Inrolled in the Inrolment Office, October*, 1829.]

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## AMERICAN PATENTS.

*For an Improvement in the manufacturing of Gentlemen's Stocks,*—G. R. Lillibridge, *New York.*

The foundation, or stiffening part of this stock, is formed of two pieces, joined together lengthwise, say of doubled buckram. They are to be so joined that they move on each other, as on a hinge, and are hence called " Hinge Stocks." When thus formed, they are to be covered and lined in the usual way. The buckram may be rendered waterproof by shellac varnish. The claim is to " the composition, and manner of forming the hinge, by which the two component parts of the foundation of the

stock are united together, by which the same is rendered sufficiently pliable, without the possibility of becoming displaced by ordinary wear."

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*For an Improvement in making Combs.*—ELI SPERRY, *New Haven, Connecticut.*

A QUILLED back comb is to be made of wood, the grain running with the teeth of the comb; a tube of metal, the bore of which exactly fits the back of the comb, is then drawn over it, and cemented or not, as may be thought best; there must, of course, be an opening along the tube to allow for the thickness of the teeth of the comb. The claim is to "the hollow wire tube."

On the 14th of April, a patent was obtained by Nathaniel Bushnell of Connecticut, for manufacturing quill backed combs of wood, by making the back and teeth in separate parts, with the grain in each running longitudinally, the part forming the teeth being let into a groove in the back; this appears to us preferable to the plan now proposed.

There is not any drawing accompanying this specification; the patentee may say that it can be perfectly well understood without one; but the law says, "and shall be accompanied with drawings and written references, whenever the nature of the case admits of drawings."

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*For a Machine for Cleaning the Dirt, &c. from Seed Cotton;* JAMES GILLIAM, *Carrol County. Tennessee.*

A HOLLOW drum, of six feet in length, and 20 inches in

diameter, is made to revolve, in the manner of a bolting screen; but with its axis horizontal. Its periphery is formed by slats of wood, extending from end to end, and having a space of about half an inch between them. This drum is contained within a trough, or box, and rests upon friction rollers, upon which it revolves, as it is without gudgeons. A shaft extends through the centre of the drum, and is supported upon gudgeons outside of its heads; four boards are affixed by their edges to the shaft, and extend the whole length of the inside of the drum, forming wings, or leaves, standing at right angles to each other; upon the edges of these wings are placed, obliquely, flat pieces, to serve as conveyers, causing the seed cotton to pass from one end of the drum to the other. The shaft, with its wings, revolves much more rapidly than the drum. The cotton is put into a hopper, and in passing from one end of the drum to the other, is cleaned.

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*For an improvement in the Application of Power to Machinery;* ROBERT MITCHELL, *Cynthiana, Harrison county, Kentucky.*

THIS patent is for one of these outrages upon the A, B, C, of mechanics, which might astonish us were they not so frequently perpetrated. The screw of Archimedes is to be made to elevate iron balls of 200 lbs. each, which are to fall upon a bucket wheel, near its top, and be delivered at the bottom into a trough, down which they are to run into the "Elevator." "The power of one horse will run the elevator with twelve balls, weighing 2,400 lbs.; this weight applied on the side of a wheel 30,

or any other convenient number of feet in diameter, may be applied to the running of any kind of machinery," says the patentee, and no doubt he is correct, provided his machinery does not require more than the power of half a horse to turn it.

If power is to be thus gained, why fatigue and feed the horse?—a little of this swindled power may as well be applied to the turning of the elevator, and the circulating medium of iron be thus rendered perpetually current.

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## *Diorama.*

THE proprietors of this unique exhibition have presented the public with two new pictures, which in point of excellence may, beyond all dispute, be ranked among the finest specimens of the art.

The interior of Rheims Cathedral, though in a great degree destitute of the elaborate ornaments of the florid Gothic, presents nevertheless a magnificent display of architectural grandeur; and this has been so excellently depicted by the artist, in his admirable disposition of light and shade, that the imagination can scarcely believe the scene to be other than real. The minute parts of the picture have been treated with no less skill than the general *ensemble,* and as compared with its predecessor, the interior of St. Peter's at Rome, is in our opinion decidedly superior.

The view of Mount St. Gothard, at the *Passage aux Roches,* as a landscape, cannot be spoken of in terms equal to its merits. The dark, over-hanging rocks of the fissure between the mountains, from whence the spectator

is supposed to look, contrasted with the snowy tops of St. Gothard's in the distance, produce an effect truly sublime, which as a faithful representation, can only be appreciated by those who have visited such magnificent displays of nature, in her most romantic forms.

With great pleasure we congratulate the artist on the present happy effects of his labours, convince that few have equalled—none excelled him.

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## REPORT

Of the Select Committee of the House of Commons on the Laws of Patents.

(Continued from page 112.)

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Mr. John Farey further Examined;

You have said that where a man's secret is betrayed, he may have an action for damages: are you aware of any case in which such an action has been brought?—I have some confused recollection of proceedings many years ago; I cannot recollect whether it was an action, or a bill in Chancery; it was for a breach of trust; that is the only instance that I know of any proceedings upon such a subject; it was between Smith and Dickinson, I think, in 1803.

I find, on examination into that case, that the person who committed the breach of trust did not publish the invention, but took out a patent for it in his own name, and kept it for his own benefit, instead of for the joint benefit of both parties, as he had promised to do. £.300 damages was awarded in the Court of Common Pleas, and the patentee was also compelled to assign the patent to plaintiff. The validity of the patent obtained under those circumstances was not decided; but as it was probably bad or suspicious, the damages might, in the intention of the court, be a compensation to the plaintiff for impairing his right to the patent, which was assigned at the expense of the patentee, and therefore if it had been good, that would of itself have been compensation.

What means have the public of becoming acquainted with the fact, that an application for a patent has been made before the patent is sealed?—None whatever; but individuals who choose previously to lodge a caveat, will certainly have information of any application that may be made for a patent, in terms corresponding to those of their caveats. No publication of applications is made.

Can you give the Committee any information with respect to the caveat?—The caveat has no other operation in favour of the person who lodges it, than that which ought to be given to the public at large, by advertising the application for a patent in the Gazette; it gives notice to parties who have foreseen that they shall want notice.

Of what benefit is it to the person who enters that caveat?—If he require to have notice of a patent being passed, that caveat will give him notice.

Is it not a request that information should be given to him of an application for a patent?—Yes; a patent cannot pass through the office where a caveat has been lodged, without notice being first given to the person who lodges the caveat.

Supposing he opposes the patent, what steps does he then take?—If the ground of his opposition is, that he has practiced the same invention before, or has a previous patent for it, he may cause the Attorney-General (or Solicitor-General, according to which office it is in) to summon the parties, and the Attorney General, after examining the respective inventions, decides whether they are so dissimilar that the patent is to pass, or not; that course applies equally, whether the opposing party previously had the invention in common use without any patent, or whether he has a new invention in hand, for which he proposes to take a patent, or whether the invention has been surreptitiously obtained from him by the applicant, or whether the opponent has already taken a patent. The caveat has the same effect as the standing order of Parliament, whereby a notice must be given in consequence of an application to Parliament for any private bill; but with this difference, that there the notices must be given, in due time, to all parties interested, whereas in this case it leaves parties to foresee that they shall want notice, and to provide for obtaining such notice by lodging a caveat.

Will you explain what protection it is to a person applying for a patent to lodge a caveat?—In general, it is no protection whatever. If a patentee, after having disclosed his invention to some agent, or associate, or patron, before applying for a patent, has a suspicion that such person might be applying for a patent himself, at an earlier period than he, the inventor, was ready with his application, then by lodging a caveat, he

would have notice and detect the treachery, before it was too late. I know no other use that it is of. When persons apply to me for my advice respecting a new invention, and ask whether they should or should not lodge a caveat, I inquire particularly, if they have ever communicated it to any person except myself, if they say no, then I take no caveat; if they have communicated it to any other person, I inquire into the particulars, and if there is the least probability that opposition, or rivalry, may ensue from those parties, then I recommend a caveat; because otherwise those parties may apply for a patent before we can; except in such case, the lodging the caveat might be a bad measure, by calling attention to the inventor's proceedings; for although he may conceal his name by using that of an agent, still his application for a patent is not so likely to get known, as his caveat; because any person can be informed at the offices what caveats are entered, but not what patents are applied for, and in progress; unless they have entered caveats, and have notices in consequence of them, they cannot learn at once what patents are going through the offices.

Would not the effect of a previous caveat be to debar the original inventor from taking out a patent?—No, the caveat makes no opposition of itself; it merely causes notice to be given to the parties that such a patent is applied for, and will pass if not opposed; there are no proceedings upon the caveat itself, further than the clerk of the Attorney-General, or other office where a caveat is lodged, sending a notice; I have had such notices continually, but my caveats are now commonly lodged in the names of solicitors or patent agents; because I am often out of town, and the notices require immediate attention.

Supposing the case of two applications for a similar invention, would not the effect of that be to destroy the right of either party?—The only decision upon that is, that the first applicant is to have the preference; it would be scarcely possible that two should apply at the same instant of time; and priority of application is preferred to priority of invention, this is, assuming each one to have invented independently of the other. If one is a plagiarist, the true inventor would have the preference, although he was not the first applicant; that is, supposing he desired to have a patent; if not, then, according to my notion of the spirit of the existing law, the first applicant who is able, and willing, to make the disclosure of the secret, ought to have the patent, that is to be given as the price of such disclosure The first inventor ought to have the refusal, and if he declines it, then the first applicant should have it; but in all cases the disclosure is to be induced, either by the recompence offered by the grant of a patent, or by publication made in time to vitiate

an expected patent, about to be granted to another. I cannot say that this is the established practice, for as far as I can judge from what I have seen, no two Attorney-Generals have had the same view of the subject. There is no authority whatever in writing to go by.

In giving a preference to the first applicant, it is assumed that the invention has not been practised openly by either?—Upon any person proving to the Attorney-General that an invention has been publicly practised before he would refuse the patent altogether.

In case an applicant for a patent was aware that some one else had turned his mind to the same subject, would it not be of service to that person to lodge a caveat, in order that he might have notice if his rival made previous application for a patent?—That is the common case of a caveat being lodged, but it can do no great good in most instances. If a new invention is getting up so much in secrecy, that none of the rivals are informed of its existence, then a caveat has only the effect of calling attention to the subject; but if attention has been already called to the subject by other means, then a caveat has the effect of procuring a notice of any rival application.

What is the form of the caveat?—The form of a caveat runs, "Caveat against a Patent being granted to any person, or persons for any invention (in the subject of inquiry, for instance) in cotton spinning, without previous notice being given to Mr. ————," that may be the real person or any agent; the address where to direct the notice, is all that is essential as to the person.

How long does that caveat run?—Six months.

What is the expense?—The expense is five shillings at each office; and there are three offices where caveats may be lodged.

Suppose that there are two applications for a patent, and the Attorney-General informs the parties that the inventions are the same, and awards the patent to the first applicant, is it not in the power of the rejected applicant, on receiving that information to effect such a publication as will destroy the patent right?—It is in his power; but I never knew an instance where the Attorney-General did declare that there was such a similarity and equality of rights to a secret invention, as to induce him to refuse granting a patent; he has sometimes advised the parties to join their interests in one patent, when he felt difficulty in deciding, and has informed them that by contending at law, their patents, if he allowed them both to pass, would probably destroy each other. In the case of Lieutenant Parker's carriage drag, the opposition that I mentioned before, which was heard on the 8th and 9th of December, the patent having been applied for in June, it was supposed at the time of that oppo-

sition that his patent was very near its completion, and the other inventor, who had conceived the same or a similar idea, having been in the habit, some years before, of consulting me, and my brother, came up to London to apply to me. The moment he opened his papers, I said, that looks so very like to a plan which I have in trust, that I cannot undertake to advise you; but if you think of going on, apply to Mr. Millington, which he did. In that case, the person making the opposition, knowing from what I had said, that there was probably great similarity, proposed to Lieutenant Parker to make it a joint patent, to which I should have agreed on his part, if the second invention had grown up from equal date with the first; but as I thought it came too late, and when we ought to have been out of the reach of opposition, if no delay had taken place, I refused, because I expected I could prevail on the Attorney-General to quash the opposition, as coming too late; the opposing party therefore prepared to be ready to publish the invention the moment the Attorney-General should say they were the same, so as to destroy the patent, which would otherwise have debarred him from using his own invention. The Attorney-General, however, after hearing and rehearing several times, decided that there was such a similarity as to make it a case of difficulty, but that there was not such a similarity to justify him in refusing the patent; in consequence, the opponent, thinking there might yet be novelty in his plan, reserved it, to see whether when Lieutenant Parker's specification was lodged, that there would remain any difference, or invention worth his taking a subsequent patent. In this same case, the Attorney-General said, that as there was so much similarity, Lieutenant Parker must give him a drawing of the drag that was exhibited, to keep by him, in order that he might have a check against any more invention being put into the final specification, than what had been exhibited at the hearing; that was an extra and unusual expense, to require such drawing, and a hardship to forbid the patentee from making further improvements in the details of carrying his invention into execution, during the term allowed for preparing his specification. It has since that time been clearly decided by the Judges, that an inventor has a right to make further improvements during that period, so that he does not superadd any new principle, that decision was respecting Clegg's patent in January last.

Is the Attorney-General the sole judge between two patent applicants?—He is; he summons the parties before him; they bring their drawings and models, engineers, witnesses, attornies or agents to explain; and sometimes, if it is requested, he will go and visit the machinery.

Does not the sort of decision he is called upon to pronounce,

require considerable knowledge of mechanics?—It requires a very deep knowledge, to form a decision between the merits of the respective inventions, particularly as the inventions at the period when they must necessarily be exhibited to the Attorney-General, are seldom organized in that state of perfection that will enable him to judge by results only. Inventors can rarely have any chance of making their ideas intelligible to the Attorney-General, and hence they are obliged to employ some professional man who can devote more time, and more readily make out what they mean by their imperfect models, drawings or descriptions, and then attend the Attorney-General to explain for them. I have been thus in the habit of attending all the successive attornies-general since the time of Sir Vicary Gibbs, but was never required to leave any drawing or description, except once, by Sir William Garrow, and in the case last mentioned.

Can you state whether it is the practice of the Attorney and Solicitor-General, in cases of difficulty, to call in any assistant by way of an assessor?—It is not the practice, and I should doubt the propriety of his exercising such a power, if he possesses it; because an inventor would think it very objectionable that his inventions should be communicated without his consent, further than to some public officer, such as the Attorney-General, who can have no interest in it, or else to a confidential professional man of his own election.

Is it not an inconvenience that a question between two concurrent applicants should be decided by a person, perhaps, not very competent to decide such a question?—It is not felt an inconvenience, from the circumstance that the Attorney-General almost always sees sufficient ground of new invention, to grant the patent, or both, if two are applied for; therefore the oppositions become of no effect, and I never recommend any for that reason; the result is, that a man can get a patent for any thing, unless it be a notoriously old invention, and even then very slight alterations will make it appear new to a person unacquainted with inventions.

So that it is a mere formality?—Yes: if any of the attornies-general that I have attended (unless the present Lord Chancellor might be excepted) had attempted to exercise a judgment between contending inventors, it would have been very mischievous in frequent cases, and never any good; the patents being at all times subject to be annulled by a court of justice, if not found to be good in every respect; the Attorney-General recommends the King to grant the patent almost uniformly; and upon the same assumption, if there are two applications for patents for very similar inventions, he allows both patents to pass, when there would be a chance on very close inquiry, by competent judges, of finding collision. It is usual to advise the parties to

join in a patent, but nothing more. If the invention has been communicated, so that they have sprung from a common origin, and if there is some proof of that communication, justice may be done to the first inventor, if he desires to have a patent. The chance that there should be at the same time two independent inventions exactly the same, is so small, that it can only happen very rarely, in the course of things; and cases of collision are usually the result of piracies more or less flagrant.

Is it not the practice for a person applying for a patent, to present his petition at the Secretary of State's Office?—Yes, that is the first process: the petition being accompanied by an affidavit, to give authenticity to the allegation.

Is not that petition referred from the Secretary of State's Office to the Attorney-General?—The agent must fetch it from the Secretary of State's Office, after it has received an indorsement on the back, containing a reference to the Attorney-General, or else to the Solicitor-General.

What is the object of that reference?—It is to have the Attorney or Solicitor-General's opinion, on the propriety of granting such a patent as the inventor requests.

Does not that reference assume that some discretion is exercised by the Attorney-General in regard to granting patents? —Unquestionably: I suppose that form of reference is not peculiar to patents, but it is very likely that other applications to government for grants from the Crown, are referred in the same form to the law officers, or other servants of the Crown, who may be best qualified to give sound advice upon the subject.

What is the nature of the affidavit accompanying the application to the Secretary of State?—The affidavit is, that he is the real inventor of that, for which he applies for a patent, and that, to the best of his knowledge and belief, it has not been used by others, and will be publicly beneficial.

In point of fact, the discretion of the Attorney-General is not exercised upon the subject?—There is a discussion of some sort exercised, for instance, when a patent is applied for, during a time of war, for any invention which might have a material influence upon the public service, an inquiry is made, as to how far it would affect the King's service; and in many patents for inventions relative to military or naval affairs, there is a clause in the patent, that the patentee shall be bound to furnish all that may be required for the public service, at such reasonable prices as shall be settled, I think, by the boards in each service, such as the Navy Board or the Ordnance Board. In those points which might affect the interests of the King's service, discretion was exercised.

When the patentee comes before the Attorney-General, he has to give a general description of the nature of the invention?

—In case of opposition, but not without; and it is a great evil that the applicant is no way fixed to what he does intend to specify. There have been some speculators or patent jobbers, who the instant that they find out that a person of talent is occupied with an invention, apply for a patent, with a title sufficiently general to cover the invention; and having thus got the start of the inventor, if they can by any means get at the invention before the time of specifying, they have a good chance of making it their own; for even if the real inventor gets notice, and makes opposition, he is the second applicant, and is almost always obliged to make it a joint property, because unless he can prove the fact of the plagiarism, the Attorney-General can rarely be convinced of the identity of the same invention, when differently explained by two parties, with different models or drawings, and when one party has an interest in disguising the similarity; or that party may purposely describe quite a different invention to the Attorney-General, who keeps no record what it is, that the applicant applies for, or describes verbally, in case of opposition, further than as it is expressed by the title of the patent; hence, after having either from ignorance of the real invention, or from design, made a fictitious explanation to the Attorney-General, he may get the real invention by treachery, and put it into his specification, A patent was granted on the 29th November last (but is not yet specified), it is intituled, "For certain Improvements in the construction of Steam Engines, and the Apparatus connected therewith;" the patent gives eighteen months to prepare the specification; now whatever that patentee can find out, by any means, in the course of eighteen months, (or perhaps during two years, dating from the time of his first application,) that will be covered by this comrpehensive title, he may bring it forward in the specification, and nobody can prove that he did not possess the invention, at the time of his application.

Is the principal point that the Attorney-General takes into consideration, whether the title of the patent applied for, agrees with the title of any other patent, concerning which a caveat is lodged?—His clerks do that, the Attorney-General himself cannot enter into such details; if the clerks think that the application for a patent corresponds with the title of any caveat lodged, they send a notice. In judging of that correspondence between the title and the caveats, they are very liable to be mistaken. If no steps are taken in a certain time in consequence of the notice, the patent is allowed to proceed; there are I believe, three days allowed to send answers to a notice sent to a person in town, and I think, five days in the country, during which time they keep the patent waiting for opposition to be made, if any person chooses; opposition may be made, by any person who

applies in time, without a previous caveat, or notice to that person.

You recommend that the patent should be secured to the applicant from the time he makes his application?—Unquestionably; that is, I do not contend that the patent should be secured to the inventor at that time, against all objections that might be to the grant, but it should be secured against the effect of treacherous or rival publications of the same invention, before the sealing of the patent.

In case that improvement were adopted, would it not be necessary to make an alteration in the course of proceeding in other respects; for instance, would it not be necessary to make the applicant for a patent, lodge a specification at first?—Certainly, a kind of temporary specification of principles; that is the case in Spain; and in France and America, the complete specification is required in the first instance.

You mentioned the inconvenience that is felt by inventors, from persons whom you call patent jobbers, what remedy would you propose for that?—To fix every applicant, as is done in France and America, by some specification in the first instance; only that I would not recommend a complete specification to be then required, but a temporary one, containing a definition of the principle and object of the invention, leaving the patentee afterwards to prepare a more complete specification when he had organized, and proved, the means by which the invention is to be carried into effect; that final specification should be examined, and ought only to include such matters as are, in the opinion of competent examiners, a fair extension of the statement of his original idea, as expressed in the first deposit. As it is now, the patentee is not obliged in any way to declare what his invention is, till he puts in his specification to the patent previously granted to him, and in the mean time he may change his plan within all the latitude that the generality of the title will permit.

Would you advise that a person applying for a patent should have his specification ready at the time of his first application?—Not his complete specification; that is done in other countries but would be impracticable here, because the spirit of rivalry and competition is so strong, that an invention cannot be put to the test of experiment, or brought to bear in secrecy, so as to enable an inventor to defer his application until he is prepared to specify properly; that may be done in foreign countries, where secrecy can be more readily preserved, but not here. The specification, with all the details of description necessary for instructing the public how to practise the invention, cannot be made, till the invention has been actually practised; I recommend that the inventor should lodge a statement of the particu-

lars necessary to define the principle, and explain the outline of his invention: for instance, if it is an improvement in the steam engine, he should state the part of the engine to which the improvement is to be added or applied, the *modus operandi*, and the effect it is to produce; so that when the complete or real specification is afterwards made out, it can be decided by competent judges, whether it is a fair developement of the ideas originally recorded in the provisional definition.

Is not great inconvenience experienced from the circumstance, that after the application and before the enrolment of the specification, the applicant is precluded from proceeding with his invention?—There is; and also from the difficulty of making such a title as will, in the opinion of judges, correspond with his specification; he is subject to the danger of losing his patent afterwards.

Would it remove that inconvenience to secure the patent for the invention, to the applicant, without a distinct specification at the time of the application?—It should be a provisional, or outline specification, with security that during the time allowed for preparing the complete specification and granting his patent, he should be protected against the effect of any publication of his invention, but not against infringements of it. No infringement of any importance could arise in three or four months, in a new thing; the great danger is now, not of people infringing his patent, but of their publishing the invention, and thus destroying his right to the patent; and perhaps the publication may not be made, until after he has paid three fourths of the fees for a patent thus rendered abortive.

You would compel him on applying for his patent, to lodge a statement of the principles to be afterwards developed in the specification, and you would require that when the time has arrived for the inrolment of the specification, and consequently granting the patent, he should give the details, to be transcribed into the patent itself?—Yes, the knowledge of those details does not always exist at the time most proper for applying for the patent, and therefore it is impossible that they should be described, nor will they come into existence, until the thing has been put into practice; as it is now, the two months which elapse between the time of applying for the patent, and the time when the patent is granted, are lost, as to any such creation of the means of putting the invention into practice, and therefore the patentee has in fact only the remaining two, four or six months, and in that time he must prepare his specification as best he can.

Would there not be a difficulty in securing to any one, a property in what was not distinctly defined?—For a permanency it would be an excessive difficulty, but for the short term of

two or three months, it would not be any inconvenience to give a right, that is completely defined, and in some degree described, by the outline of a specification: in Spain the practice exists. In fact, every patent now granted, is in force for two, four, six and some for eighteen months, before there is any definition whatever, of the right it confers; but that is an evil, as I have shown.

You mean that he should be not only authorized, but compelled, in the first instance, to give a specification something more precise than is frequently now given?—Certainly. In the Spanish law it is optional; but I think it should be an essential condition for the first step; no record at all, is now given in the first instance, nor is any writing usually preserved, in case it is explained to the Attorney-General, upon hearing of opposition.

And you would require this greater precision in the meaning of the first application, not for the benefit of the applicant, but for the benefit of other inventors that are occupied at the same time, on the same subject; it is an intolerable nuisance to persons who are engaged in speculations, that they are perpetually in danger of having their inventions or improvements stolen from them, and put into the specifications of some existing patents, not yet specified, but which have titles that will cover their inventions. Such undefined patents are like legalized receiving houses for stolen goods.

Are the inventors whose ideas have been so appropriated by previous patentees, called upon to prove the negative that the patentee did not invent what he specifies?—Yes; they must prove that the invention was in use before the date of the patent; or that it was communicated surreptitiously from them to the patentee after the date of the patent; their proving that they invented it or put into use themselves after the date of the patent is not sufficient, because the invention became the property of the inventor from the date of the patent, although he is not called upon to declare what it was for a long time after.

Is there any limiting law to the time which is allowed for the specification after the issue of the patent?—None by law; by custom it is two months for each patent; thus upon a patent for England two months is allowed, for England and Scotland four months, and for England, Scotland and Ireland, six months; of late years, on declaring in the first instance that they mean to proceed with patents for England, Ireland and Scotland, they obtain six months at once in the English patent. I believe they must take some of the first steps towards applying for those Scotch and Irish patents, and must incur some expense in consequence, but they are no way bound afterwards to proceed with the Scotch and Irish patents to completion,

It is quite discretionary in the Crown how long time should be allowed, and on special showing (I believe, to the Attorney-General) longer terms are occasionally granted. The patent I have mentioned for improvements in steam engines is eighteen months; there were several eighteeen months patents granted ten and fifteen years ago, and great complaints were made of the evil. I was employed in 1816 by parties who had just got a fifteen months patent sealed for themselves, but not specified, to draw up arguments and instruct counsel to complain of another such patent then in progress being granted, with the same time, to their rivals in trade, and to oppose that second patent being sealed by the Lord Chancellor, on the public grounds, I have before stated. Although the Attorney-General had made out and passed it, as far as he was concerned, Lord Eldon refused to seal the patent as being very improper, and intimated that no more such patents should be sealed, and there have been none till this recent instance. I do not mean to say that this patent is any intentional unfairness, for it is granted to Colonel D'Arcy, the executor of the real inventor, who is dead, and hence I suppose he showed to the Attorney-General that there was some necessity for the unusual time, to get the papers of the deceased together, or to examine his manuscripts; but the principle of granting an undefined legal right to be in force for a year and a half, without definition, needs no comment. The old pretence for such long time was to get time to apply to Parliament to have the specification kept secret, in order that the invention might not get to foreign countries.

Do you see any inconvenience in allowing a long time for the specification?—It is essential to getting sufficient specifications made of important inventions, to allow a long time; and on the other hand, it is an excessive grievance to persons engaged in like pursuits, unless some provisionary definition of the legal right, that is conferred by the patent, were to be made public.

Would not the grant of a long time for the specification, enable a fraudulent party to avail himself, for a limited period, of the patent without revealing it to the public?—It might; but even eighteen months would commonly be of no value at the commencement of a new invention of any importance; because it is so difficult to begin at first and only occasions expense instead of profit.

Are there not many inventions that are only valuable for a short time?—Very rarely; they must be very evanescent inventions; such as the kaleidescope, and the hobbyhorse called velocipede, which must necessarily be of no value to the community; I consider that such patents are of no public utility.

Are patterns ever the subject of patents?—No; but it is not well defined, nor is it easy to define, what degree of invention

shall or shall not be the subject of patents; it is very desirable that patterns should be protected in some ready way, but not by patent; it would be too expensive and tedious.

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## Arthur Howe Holdsworth, Esq. a Member of the Committee; Examined.

ARE you prepared to furnish the Committe with any suggestions upon the subject of the Patent Laws?—I will furnish them with such information as has come to my knowledge from facts that have occurred to myself, not assuming any thing of a legal opinion; leaving to the Committee to form their own judgment, as I shall do myself, upon the things that have occurred. To make this subject as clear as I can, I would first state that there are patents of various sorts; I would divide them first into two, one for a process for articles of which the patentee is himself the maker; another for a process which it is intended shall be used by others, to whom he would grant licences for that purpose. For instance, I may be in a particular trade, and take out a patent applicable to that trade; or I may not be a tradesman, and then I should take out my patent for the purpose of licensing tradesmen. I mention this only to show, that to comprehend the use of the patent law, we must have a view to both these cases, otherwise we shall not be likely to come to the necessary conclusions. These patents also are divided into different subjects, mechanical, chemical, and chemical and mechanical united. It has been stated that patents may be multiplied to too great an extent; I conceive that idea arises from this circumstance only, that as the law is not clear with regard to patents, so many are obtained that appear defective in law which by confusing workmen really do mischief; but if the law be made so clear and defined that a patent for a something really useful, when taken out, would be found to be secure, then I cannot conceive that we can have too many patents, as they are the reward of men's ingenuity. One man has a property in the funds, another in land, a third man in the powers of his head, evidenced by his inventions; and I conceive that if you were to attempt to limit the number, you would at once cramp men's ingenuity, and not give those who are clever their fair value in the market, because their brains are the only property which they possess. I will first state the difficulties

which appear to arise on the taking out of a patent. There is nothing more common, than that two persons of similar habits and pursuits should be thinking of the same thing at the same time, and it at once becomes a race between them, as the law at present stands; at the moment that one is known to be soliciting a patent, the other man uses every means in his power to discover what the other person is about, that the first may not clash with his; and if he is a dishonest man, and finds that his own is not good, that he may so oppose the other as to render that of the first person useless, unless he will agree to allow him to become a participator with him by making it a joint patent. But that is not the only difficulty in which he is put at present; there is that of intituling his patent in such a way as that other persons, not then thinking of a patent, may not be by it induced to do so; or that others, who know the value of a patent for such a subject, may not set their brains at work to endeavour to obtain one also. That circumstance happens to be within my own knowledge at this moment; there is a great want of a certain something at this moment in a particular kind of business, a friend of mine has discovered the thing required, and I am quite satisfied, from knowing exactly what he is about, for he first set about it at my request, that he could go for a patent, and that the patent would be very valuable. I also know another person, with whom I am well acquainted, who being in the trade, is aware of that necessity as much as myself, and I feel satisfied that if my first friend were to go for his patent, the second without meaning at all to do the first an injury, would be immediately set at work, and would at once know, from his knowledge of the subject, what the other man must be about, and they would come in collision; and therefore the only probable remedy at this moment would be to bring the two parties amicably together. I would exemplify this also by another circumstance of the same sort, where a person was absolutely soliciting a patent; a friend of that person informed me of it where a party was assembled in this city. I was surprized at what he stated, because it appeared to me almost next to impossible that the end stated to be sought for could be obtained. I told the party that I would endeavour to find it out, and that if I did, I would come to them and inform them of what I had done; and I came back on the day I had promised, and told the party that I had accomplished my object. The person who first mentioned it to me, asked if I had any objection to allow a third person to be the umpire between us; on condition, that if our ideas were the same, we might unite our forces, but that if our ideas were different, each might still proceed. I agreed, but I did not meet the other man, but the third person who was to be the umpire only; and when we had

both stated to him our ideas, they were so perfectly unlike, though attaining the same object, that we both took out patents. That patent I have never used, but it is at this moment in existence; they were patents for making gas-holders capable of containing a double quantity, when compared with their usual contents. In further illustration of what I have said respecting different men pursuing the same object, another patent came within my own knowledge, where a friend of mine and myself were concerned. We believed a great object was to be gained by a peculiar process in a trade of great moment, and I took a great deal of pains whilst I was travelling in different parts of England, to ascertain whether it would be so or not, and whether such was known. We did not conceive that any person had ever thought of the same thing. Nothing had ever transpired publicly as to such belief, but when I returned to London, a friend told me that he thought a person had been taking out a patent very similar to it, and referred me to the brother of the patentee, who referred me at once to the specification, and I found that we had both been travelling exactly to the same point and by the same road; and although the process has not as yet been used, I am quite sure it will be found a very valuable discovery. This, then, will assist in accounting for the cause of our having heard so much of persons giving titles to their patents which do not at first sight appear to convey the real meaning of that for which they ultimately specify. It is not for the purpose of improper deception, but it is because the law so stands at present, that if they do not so guard themselves they are liable to be imposed upon, and to have all the benefit of that invention which has been the fruit of a vast number of years consideration, in one moment swept away from them.

Can you suggest any remedy for these inconveniences?—I should conceive, from all the difficulties that have occurred to myself, and to the friends I have been acquainted with, that the best remedy would be what has been recommended by other witnesses, namely, that the inventor should be secured, under such conditions as shall hereafter be thought right, from the time he makes his first affidavit, so that other parties may not have the opportunity of availing themselves of his first discovery of his invention to the public. This opens another circumstance worthy of the consideration of the Committee before they make their Report on the Specification, because it to a certain degree alters the state in which a person is placed; I conceive that if the patentee could be secured from the time of his petition, he might, as regards his monopoly, be allowed any time he pleased to specify, provided his patent bears date from the sealing, that is, as between him and the public, as he would still have only his fourteen years, and these running from the period when his

patent is sealed. If he required a longer time to specify, from any thing particular, the public would be no losers by that, inasmuch as the specification is a part that is of no importance to any body but himself, if the law really secures his invention to him till his fourteen years has expired. As the length of the time occupied by him in his experiments is a loss to himself only of that portion of the monopoly, and it is therefore not a question as between him and the public on that head, that can in the slightest degree affect the public; the only way it can effect them, is in preventing others from proceeding with other patents, fearing that they may run upon the road which he has already taken; therefore a limit on that account would be required, and the question would ultimately be, to what time that limit should, under such circumstances, be confined. The next point to which I would go, is the difficulty under which patentees appear to me to labour after patents are obtained. The first which strikes me is the case in which valuable patents may be defeated through the ignorance (I mean mechanical and chemical ignorance) of both Judges and juries, who with the very best intentions in the world to do justice as between the parties, yet not being fully aware of the value of the minutiæ of those peculiar subjects, will get the contending parties into greater difficulties than those in which they originally started; and this is greatly felt at present from that spirit of attack which is now so constantly exercised against the patentees, urged on by this particular fact, that the public, or the parties attacking the patentee, have every thing to gain and nothing to lose by it, whilst the unhappy patentee has every thing to lose, and by no possibility any thing whatever to gain by it. It is a circumstance well known to those who have been in the habit of taking out patents, or have given their minds to mechanical subjects, that whenever a patent for a valuable invention is taken out, there are persons who immediately try by every means in their power to gain all the advantages to which the patentee is entitled, by studying how he may avoid in some way or other the specification, for by getting through that instrument a perfect knowledge of the process, he becomes perfectly acquainted with the views of the original inventor, and then endeavours, through some other mode as not yet practised, to avoid the specification, giving to his mind a view of the subject which he never would have thought of, if the original inventor had not yet first obtained the monopoly which, on specifying, the patent gives him; and it is not at all considered, I am sorry to say, by many persons in the slightest degree dishonest to do every thing in their power to defeat a patentee, after he has obtained his grant. This has occurred to

myself in a most extraordinary way, and not confined at all to mechanical persons, but extending to others in no degree connected either with science or mechanics, but who seem to have taken up the same idea, viz. "that a patent is fair plunder." I would instance one set of persons, who first of all agreed to take a licence for the use of the patent process, and after having so done, whereby we conceived that they had acknowledged our right in it, they set us at arms length, and used it; drove us into Chancery to open their door to see what they were doing; that is, to obtain legal proof of it, and then into court after we had obtained that proof; and the night before we were to come to trial, compromised and took a licence from us. Another party after this, conspired with three or four other set of men, dared us to the proof, and denied that they were using it. We were then obliged to go again to Chancery; but they consented to allow us to inspect. Upon inspection by a third person, we found they were using our process; they continued to use it, and defied us: we had then no remedy but to charge them with this in Chancery, and to oblige them to come in and answer for themselves; one of these companies denied that it was a patent or that they knew it was a patent, although the company was established on this basis; and they would not have obtained the power of becoming a company at the time they did so, if the patentee had not discovered his process; he came to London for them, and was ready to attend a Committee of the House, and to give proof of his invention; but they allowed a clause to go into the Blill, which compelled them to adopt this or a similar description of process, and they had paid him for the trouble he had taken, and for his journey to town upon it. In company with those, were two other large and powerful companies, from one of which a deputation had waited on the patentee long anterior to the time when we discovered they were using it; they had acknowledged the value of the process; we had a letter in our briefs from themselves, requesting to know the terms upon which we would license them. We visited their own place, we saw they never had used it, and they abstained from using it at that time, because they could not come to terms with us; they let a short period go over, and then used it privately; denied that they were doing it, and ultimately joined the other party in opposing us. They were at last, however, obliged to appear in Chancery by Affidavit; and then the whole of these conspiring parties attempted to bolster their case, by bringing persons to swear by affidavit that the thing had been used before any of those negociations or communications had taken place. It fortunately, however, happened for us, that we had anticipated the principal evidence, and expecting where he might state he had used it, as having been employed there

anterior to our patent, we applied to the party who had employed him, and we had an affidavit from that person stating that there never had been any process similar to ours used in his house; so that when the affidavit of this man was produced, it was at once refuted; because, fortunately for us, he stated that he had used it at the very house with respect to which the owner (a most respectable person, and perfectly free from any connection with any of the parties) had already given us the directly opposite proof; it also fortunately happened that this man had published a book, in which he stated all the inventions that he had made; and it bore date subsequently to the patent of my friend, and when his process was well known; and although this witness swore that he had so used it, when we searched his book we found he did not say a word about it; though he begins by stating that he would give an account of all his inventions. This case was of so much consequence, that we employed four counsel in Chancery; we had consultations, and every thing that could be necessary for a case of the greatest importance. We appeared in court for a decision upon whether or not an injunction should be confirmed restraining those parties; a compromise was proposed; we consulted our counsel, and although we knew that they had the strongest case upon affidavit that they ever saw, and where this peculiarity attached, that if those who had sworn on our side had said a single word wrong, there were, I will venture to state, hundreds of persons who could have denied us, and yet not *one* did; still so uncertain did the counsel consider the view that the court might take of the case, that they advised it, as the more prudent course on our part, even then to come to a compromise, on their all taking licences; and under their advice we did so with all the parties, who had thus conspired against us: but this did not rescue us from attacks; for at this time five or six other companies are again conspired together to endeavour to defeat us, although we have granted licences to at least fifty different sets of people, and the patent has but two years to run; so that I would venture to make this remark, that, situated as the law is at present, and with such a state of society as I have described, patents may be rendered next to useless, (however good they may be,) by the constant attacks that can be made upon the patentee, supported as these attacks now can be by such evidence as it is in the power of almost any man occasionally to obtain.

Can you suggest any remedy for the evil you have described?—It appears to me, that the best remedy that the law of the country, as far as I understand the law, would at present offer, would be this, that after a person has publicly used his patent for any given number of years, (say five if you please,)

and no one has thought it worth his while to bring a *scire facias* against him, on the score of its not being a novelty, or having been used before, and therefore not a fit subject for a patent, whilst he has himself attacked (thereby showing his disposition) those who have endeavoured to pirate his invention, although compromises may have taken place between him and other parties, the patent should be deemed good and valid, and that an injunction should issue against all future aggressors, which should not be dissolved, the same as if his patent had been proved valid in court. I conceive that the King having granted a patent, the law should originally presume that that patent is a good one, and that the onus should be on others who believe it bad, to repeal it by *scire facias*, within a given time; it should not rest on the patentee to be eternally driven to bring action after action, and to be harrassed to the very end of his patent. My reason for stating this is, that if you consult upon such a subject, you will be told, as we were very properly told, you may safely compromise, as it will be clear to the world, that if the parties against whom you bring your action compromise with you and take a licence, that the other party found themselves in error; so we fancied, but the truth was not so; others attacked us in the same manner, and then when we had to consult counsel upon our second case; they said, although in the former case you could not try for an *ex-parte* in-injunction, we think now, after having first gone into Chancery, and then into court, and the parties compromised with you, taking your licence, that will be sufficient proof after so many years of use, that we have very little doubt that the court will, upon your showing that all those things have taken place, and that you have, during eight years, used all due diligence to bring those you could detect to account, but that the court will confirm an *ex-parte* injunction; but the result really was, that they themselves deemed it afterwards prudent in court to advise us again to compromise upon the parties all taking our licence to use; and again we were left in the tenth year in the same situation that we were in the very first day we started; I conceive therefore, that if after any given time in which persons have allowed the patentee to work upon his specification, and have not within that given time thought it worth their attention to show that his patent was not originally good by moving a *scire facias* against him, that after that period the patent should stand good, provided you could prove that you had used all due diligence to prevent every one from working upon your process, with whose conduct you could be proved to be acquainted. It was proposed to the Committee, to preserve the patentee against the description of evidence which I have mentioned, not to permit any evidence to be given of its having been used before a certain

time anterior to the sealing of the patent, and that parties should not have the power of going back to any indefinite period they please, when it would, from length of time, be impossible to get evidence to rebut it; leaving the proof of prior use, as at present, on the word of one man; by which any patent can be so defeated; because it was stated, and with much justice, as my experience teaches me, that nothing is more common than to find persons who will come into court and swear that they have so used a certain process, and such swearing will defeat a patent, although no collateral circumstance is adduced that can confirm it, the court feeling itself bound to rely upon the bare oath of a solitary individual. With regard to another proposition which was made, and which I have considered, as to the circumstance to which I am now referring, namely whether a proof of prior use should be allowed beyond a certain number of years, anterior to the sealing of a patent; that seems to have been the policy of the French law, as evidenced by a very strong fact, namely, that a patent taken out and neglected to be used only for two years, shall so perfectly destroy it, in consequence of the neglect of the first person, that another person may take it out again, and it shall be good against all the world. In proof of this, I can state that a friend of mine, with whom I was interested, took out a patent in France; it was necessary, under this law, to use it within two years; this he had no means or even view of doing himself, but to license the use to persons resident in France, a treaty was entered into with a man there; circumstances, which he could not control, prevented him from coming to an immediate conclusion; the parties with whom he was treating kept putting him off from time to time, after his having placed one of his machines in the hands of a banker, who was also a gold and silver wire-drawer; the patent was for drawing wire through holes made of *jewels*. The treaty was continued till the two years were run out; he then went over, when he was told the treaty was at an end, that he had never used it, and that his patent was forfeited. Upon closer investigation, he found that the moment he had placed the jewelled hole in the hands of the banker, he had sent it to Geneva, where an ingenious workman, who had been in the habit of perforating holes in jewels for watches, was employed to make a set, which they had found completely answered the purpose; and he learned, to his annoyance, although he had been offered 10,000*l.* for it, this banker had then, by this stratagem, availed himself of the law of forfeiture, by keeping it out of use; that he had taken out a patent for five years, had given the holes to his workmen at Lyons, and having established the use, had so reduced the labour, that he obliged the workmen to labour at two thirds of their former prices, thus reaping the reward of his infamy, the extent of which

is inconceivable, where they draw wire for almost the whole of the continent for making gold and silver lace. I conceive however, that so far as regards the period of two years, the facts I have stated have shown the badness of the law; because if a patent was to be forfeited in this country for nonuser at two years from its date, that is from the sealing, no person would like to take out a patent that he did not himself work, because a third person taking out a patent for the most ingenious thing in the world, could be defeated, by the people in the trade refusing to work upon it until the expiration of the two years, when the thing would of necessity become public; but I conceive if it were lengthened to five years, that would very much alter the case. I merely throw this out by way of showing how the thing is done elswhere, and what might be its operation.

What is your opinion with respect to allowing patents to be taken out for a principle?—With regard to patents for a principle, from the evidence which has appeared before us, and from what I myself have previously understood upon matters of this sort, there is great difficulty, from different cases which have appeared to be ruled as for a principle, while I believe the law to be, that a principle cannot be patented unless it is reduced to practice. It was suggested by one of the witnesses that the law should be settled one way or the other, and he seemed to advise rather that principles should be allowed to be a ground for taking out a patent; but if it is to be ruled on one side or the other, I conceive that it would be wiser to say that the word "principle" never should appear at all in the case, and that the Judges should be bound by an absolute practical process, without at all inquiring upon what principle it is, but whether the thing done be a new and entire fact, and one worthy of a monopoly. As the word principle throws it into confusion on one side or the other, as I conceive such cannot be patented without an effect or process being produced upon the principle, it would do better to avoid the word principle altogether, and say that the fact or process specified shall be the thing that shall be secured. I will exemplify the patent with regard to shearing cloth. There it was held that no man afterwards should shear from list to list, because that was the *principle* of the original patent; but if another man can shear from list to list by a process perfectly distinct from any which the first man has described in his specification, I do not see why the second person's ingenuity is not to be equally rewarded; for if that man in specifying originally, conceived that it could be done by more than by the plans specified, he would have embraced them all; and at all events I feel, that taking the great bulk of patentees, you may put the patent law into a shape that would do more real good by excluding principle, than by admitting principle to

be taken into consideration. One of the witnesses stated that Bolton and Watt's patent was for a principle; he was asked what that principle was, and he said he had not sufficient time to consider. I imagine that the ground upon which that patent was taken out, would rather be against the case of establishing a principle than otherwise. The only difference between Bolton and Watt's engine and those which had been used before, was this; that those engines that had been used before condensed in the cylinder, and consequently cooled the cylinder at every stroke. Bolton and Watt considered that a great saving both of time and of fuel would be gained, if they were not to condense in the cylinder and cool it at each stroke, because certain portions of steam were naturally lost in again getting up the proper heat of the cylinder; they therefore contrived a second vessel, called the condenser, communicating by a pipe with the cylinder, a jet of cold water being let into the condenser; so, being a separate vessel, the moment the steam is condensed in that, it creates a vacuum, so that the remainder of the steam continues to rush in and fill it up, till the whole becomes a vacuum, from the vessel in which the condensation takes place, to the most distant part in the cylinder, and does not tend to cool the cylinder as in the former instance. If there was a new principle, that principle only could be from the want of prior knowledge at that time, that if you made a vacuum in one vessel, and there was a hole communicating with another chamber, the steam would rush in to fill up that vacuum, which I conceive to be a principle perfectly known before, and that therefore the engine was not a new principle, but the new application of a known principle to a new purpose. It is supposed that Bolton and Watt's patented a principle, when they took out a patent for their steam engine; I believe they only patented a method of applying an old principle to a new engine.

Do you think that the specification should be allowed in any instances to be concealed?—I conceive there may be times when a concealed specification can be of value to the patentee, and at the same time not an injury to the public; and that when witnesses have been asked as to what would be the effect of a concealed specification, they have been led into a difficulty, and unable to give the Committee satisfaction upon it, because they have not considered what would be the state of a patent under such new circumstance. Men speak frequently of the uselessness of a concealed specification, because they could not defend their patent without bringing it into court, and that, therefore, their own objects would be defeated by the first man who pirates them. And it is also asked, Would it not be the means of permitting other persons to work innocently upon the same plan which they have already patented, and thus bring those persons

into difficulties with the patentee, when he should discover the process they were using? There is no doubt, and that the latter would at first sight appear to be the fact. But it would be a matter of policy, and worthy the consideration of the patentee, whether or not he would attack such party, and thereby open his specification; and whether he would not rather let such man continue to work, provided that man took due diligence to keep his mode concealed from the public: and the reason why I mention this is, that I know there are persons that have made valuable discoveries, and are now working secretly upon them, preferring to trust to concealment rather than have a specification which will enable other persons, anxious to run on the same road, to discover the process by which they themselves are working. I do not feel that any other person would be put to any hazard, provided the same justice was given to both parties as is already attempted to be given with regard to all other alterations of the law; because, supposing a patentee had this advantage given to him, a condition should be imposed upon him, that any man who worked upon the same process during the time he kept his specification concealed, should be allowed to continue that work till the end of that patent, free of any charge from the original patentee; and that the patentee should have an action at law only against such persons (as is at present the case) who should use his process after he had made his specification known. I state this in consequence of believing, that it would be in many instances much more valuable to a manufacturer to allow even a second and a third man to work, provided they put their heads together and concealed the process from the public at large, than to throw it open, and to leave the whole world to pirate and destroy him, as is at present the case. This could only be of value on certain descriptions of patents, to which I have originally referred, namely, those which are used by the manufacturer himself, and not those of which profit alone is to be made by licensing them to third persons. I would under no circumstances therefore say, that all specifications should be concealed from the public; but I cannot but believe, that it would be advantageous in many instances if a man could have the power of getting it concealed during such period as he might think to his own advantage to keep it so.

Have you ever known that patents have been licensed to some individuals, and that the patentées having fixed upon the terms upon which licences might be fairly granted, have refused to grant them to other parties?—It has never come within my own knowledge.

Have you ever known cases in which any sort of arrangement has been made between the patentee and the party to whom it has been let, that it should not be let to other people?—It has

been proposed to me, but I have never acceded to it. I have heard it questioned by a lawyer, whether it would not be contrary to law.

In the observations you have made, with reference to keeping a specification concealed, you have not adverted to one inconvenience which it has been stated would arise to the public from not knowing what the patent is granted for, so precisely that persons might not engage in discovering inventions which have already been patented?—I think that inconvenience could not happen, because I have already stated that no man running the same course should be liable to any action for so working, so long as the patentee thought it fit to keep his specification concealed.

Are there not cases in which a patent could not be adequately protected without allowing it to be taken out for a principle? take, for example, the case mentioned by Mr. Rotch in his evidence, of a wash being exposed as a shower to the action of heat?—I presume that any man who has ingenuity enough to invent what is considered a new principle, could only do it through his knowledge of the wants of different manufacturers of an improved process in their business, which process he has applied his mind to accomplish; and that the same mind that would see it fitting in one way, would, before he specified, take the whole range of mechanical means by which that could be accomplished, and that he would be fairly entitled to specify for all those means, and that these would hold good for all the different manufactures to which they could be applied; that he would have a fair right to specify for all such manufactures; and as to those which did not then exist, or of which he had at the moment no knowledge, that to those he would not be entitled to any right, for he would have given nothing to the public as an inducement.

You conceive that a person who has made an invention could foresee all the means by which that invention could be used?—I do conceive so; that is, all the means that are usually known in mechanics, and are in practice.

You have said that patents are sometimes infringed by introducing some slight alteration in an invention, so as to avoid trenching upon the specification?—Yes; but by alteration I mean another road, suggested by knowing the first: a slight alteration would not give the second man a patent, but it might suggest to the second man another road, which at once defeats the value of that which has taken the first man years to accomplish.

You have stated that the presumption should be in favour of the patentee; do you think that presumption should be raised, while the present loose mode of granting patents continues?—

I should say always in favour of the patentee; because it is the only reward for his ingenuity, and he is one man against all the world.

You are aware that a patent is granted now without any examination on the part of the Attorney-General, unless it is opposed?—Truly; but the best security you can get in this day that a patent will not be taken out, unless the party thinks it is good for something, is the expense; I do not presume that that description of man who is in the habit of taking out a patent would go to that expense, unless he had, he believed a profitable end to gain by it.

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## New Patents Sealed, 1830.

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To John M^c^ Innes, of Auchenreoch, and of Woodburn, in that part of our United Kingdom of Great Britain and Ireland called Scotland, Esq. for his having invented the manufacture or preparation of certain substances, which he denominates the British tapioca, and the cakes and flour to be made from the same.—Sealed 24th April, 6 months.

To Samuel Brown, of Billiliter Square, in the city of London, commander in our Royal Navy, for his having invented certain improvements in making or manufacturing bolts and chains.—24th April, 6 months.

To Joseph Cochaux, of Fenchurch Street, in the city of London, merchant, in consequence of a communication made to him by a certain foreigner residing abroad, for an invention of an apparatus, calculated to prevent or render less frequent the explosion of boilers in generating steam.—24th April, 6 months.

To Paul Descroizilles, of Fenchurch Street, in the city of London, chemist, for his having invented certain im-

provements in apparatus for economizing fuel in heating water and air, applicable to various purposes.—24th April, 6 months.

To Thomas Cook, of Blackheath Road, in the county of Kent, lieutenant in our Royal Navy, for his having invented certain improvements in the construction and fitting up of boats of various descriptions.—24th April, 2 months.

To James Perry, of Red Lion Square, Holborn, in the county of Middlesex, bookseller and stationer, for his having invented an improvement or improvements in or on pens.—24th April, 6 months.

To John Wilks, of Blue Anchor Road, Bermondsey, in the county of Surrey, engineer, millwright and machinist, (one of the co-partners in the firm of Bryan, Donkin, and Company of the same place, engineers, millwrights, and machinists), for his having found out and invented an improvement or improvements in a part or parts of the apparatus for making paper by machinery.—28th April, 6 mo.

To Thomas Petherick, of Penfullick, in the parish of Tywardreath, in the county of Cornwall, mine agent, for his having invented certain machinery for separating copper, lead, and other ores, from earthly and other substances, with which they are or may be mixed, and which is more particularly intended to supersede what is commonly called jigging.—28th April, 6 months.

To John Walker, of Weymouth Street, in the county of Middlesex, Esq. for his having invented or found out an improved cock for fluids.—4th May, 2 months.

To Henry Robert Salmon Devenoge, of Little Stanhope Street, May Fair, in the county of Middlesex, gentleman, in consequence of a communication from a foreigner residing abroad, for certain improvements of machinery for making bricks.—8th May, 2 months.

## CELESTIAL PHENOMENA, FOR JUNE, 1830.

| D. | H. | M. | S. | |
|---|---|---|---|---|
| 1 | 0 | 0 | 0 | ☉ before the Clock 2 *m* 36 Sec. |
| 1 | 3 | 0 | 0 | ☽ in conj. with ♑ in Virgo. |
| 2 | 13 | 0 | 0 | ☽ in conj. with ♃ in Virgo. |
| 3 | 0 | 0 | 0 | ☿ Stationary. |
| 4 | 6 | 0 | 0 | ☽ in conj. with *γ* in Libra. |
| 5 | 0 | 0 | 0 | ☉ before the Clock 1 *m* 58 Sec. |
| 5 | 9 | 0 | 0 | ☽ in conj. with *φ* in Oph. |
| 6 | 2 | 19 | 0 | Ecliptic opposition or ☉ full moon. |
| 8 | 12 | 0 | 0 | ☾ in conj. with *d* in Sagett. |
| 10 | 0 | 0 | 0 | ☉ before the Clock 1 *m* 4 Sec. |
| 12 | 13 | 0 | 0 | ☾ in conj. with *λ* in Aquarius. |
| 12 | 22 | 0 | 0 | ☾ in conj. with *φ* in Aquarius. |
| 13 | 10 | 49 | 0 | ☾ in □ or last quarter. |
| 15 | 0 | 0 | 0 | ☉ before the Clock 8 Sec. |
| 18 | 9 | 0 | 0 | ☾ in conj. with *γ* in Taurus. |
| 18 | 11 | 0 | 0 | ☾ in conj. with 1 ♉ in Taurus |
| 18 | 11 | 0 | 0 | ☾ in conj. with 2 ♉ in Taurus |
| 18 | 16 | 0 | 0 | ☾ in conj. with *a* in Taurus. |
| 19 | 15 | 0 | 0 | ☾ in conj. with ♀ long. 20° in Taurus. ☾ lat. 4° 38′ S. ♀ lat. 4° 15′ S. diff. of lat. 23.′ |
| 20 | 0 | 0 | 0 | Clock before the ☉ 10 Sec. |
| 20 | 8 | 8 | 0 | Ecliptic conjunction or new moon. |
| 21 | 11 | 50 | 0 | ☉ enters Cancer.. |
| 23 | 20 | 0 | 0 | ☽ in conj. with ♌ in Leo. |
| 25 | 0 | 0 | 0 | Clock before the ☉ 2 *m* 7 Sec. |
| 25 | 1 | 0 | 0 | ☽ in conj. with ♇ in Leo. |
| 26 | 5 | 0 | 0 | ☽ in conj. with *τ* in Leo. |
| 26 | 17 | 0 | 0 | ☽ in conj. with *β* in Virgo. |
| 27 | 0 | 0 | 0 | ☿ Stationary. |
| 27 | 8 | 0 | 0 | ☽ in conj. with ♃ in Virgo. |
| 27 | 15 | 16 | 0 | ☽ in □ first quarter. |
| 27 | 20 | 0 | 0 | ☽ in conj. with 1 ♈ in Virgo. |
| 28 | 11 | 0 | 0 | ☽ in conj. with ♑ in Virgo. |
| 27 | 20 | 0 | 0 | ☽ in conj. with ♃ in Virgo. |
| 30 | 0 | 0 | 0 | Clock before the ☉ 3 *m* 9 Sec. |

The waxing moon ☽.—the waning moon ☾

Rotherhithe. J LEWTHWAITE.

## METEOROLOGICAL JOURNAL, FOR APRIL AND MAY, 1830.

| 1830. | Therm | | Barometer. | | Rain in inches. |
|---|---|---|---|---|---|
| | Hig. | Low | High. | Low. | |
| APRIL | | | | | |
| 26 | 69 | 43 | 30,14 | 30,12 | |
| 27 | 65 | 30 | 30,14 | Stat. | |
| 28 | 69 | 33 | 30,09 | 30,04 | |
| 29 | 72 | 39 | 29,96 | Stat. | |
| 30 | 73 | 39 | 29,85 | 29,82 | |
| MAY | | | | | |
| 1 | 63 | 34 | 29,88 | 29,81 | |
| 2 | 66 | 36 | 30,06 | 30,02 | |
| 3 | 64 | 30 | 30,13 | 30,11 | |
| 4 | 66 | 32 | 30,12 | 30,10 | |
| 5 | 72 | 34 | 30,04 | 30,01 | |
| 6 | 80 | 49 | 29,91 | 29,74 | |
| 7 | 77 | 49 | 29,64 | 29,54 | |
| 8 | 63 | 40 | 29,49 | 29,48 | |
| 9 | 51 | 45 | 29,34 | Stat. | ,125 |
| 10 | 52 | 41 | 29,60 | 29,37 | ,375 |
| 11 | 50 | 37 | 29,72 | 29,64 | ,1 |
| 12 | 55 | 38 | 29,81 | 29,72 | ,125 |
| 13 | 54 | 38 | 30,02 | 29,85 | |
| 14 | 59 | 31 | 30,10 | Stat. | |
| 15 | 67 | 40 | 30,15 | 30,11 | |
| 16 | 70 | 35 | 30,21 | Stat. | |
| 17 | 78 | 45 | 30,16 | 30,11 | |
| 18 | 76 | 47 | 30,01 | 29,89 | |
| 19 | 68 | 45 | 29,86 | Stat. | |
| 20 | 66 | 45 | 29,86 | Stat. | |
| 21 | 67 | 46 | 29,80 | 29,75 | |
| 22 | 63 | 45 | 29,86 | 29,69 | ,325 |
| 23 | 66 | 41 | 29,89 | 29,80 | |
| 24 | 67 | 51 | 29,69 | 29,66 | ,325 |
| 25 | 63 | 43 | 29,64 | 29,49 | |

EDMONTON. CHARLES H. ADAMS.

THE

# London

## JOURNAL OF ARTS AND SCIENCES.

No. XXVIII.

[SECOND SERIES.]

# Recent Patents.

*To* LEMUEL WELLMAN WRIGHT, *of Mansfield Street, Borough Road, in the county of Surrey, Engineer, for certain Improvements, in the construction of Cranes.*—[Sealed 17th August, 1827.]

THE principal subject of this Patent is a machine or engine, consisting of a novel and very ingenious combination of mechanical powers, adopted to the raising and lowering of heavy bodies. It is constructed without either toothed wheel or pinions, which form the essential parts of all other cranes, its power being derived from a peculiar adaptation of the lever and wedge. The following is the

SPECIFICATION.

"My improvements in the construction of cranes consist, first, in the application of the combined powers of the crank, lever, and wedge, acting on friction

rollers, mounted on wheels, which wheels are attached to the drum or barrel, that the draft rope or chain winds upon: and, secondly, in the application of rotatory engines, alternating rotatory (vibrating) engines, or common, vertical or horizontal cylinder engines, to cranes of any description; the motive power to work such engines, and thereby to work the cranes, being the expansive force of compressed atmospheric air.

" Plate VII, figs. 1, & 2, exhibit the first part of my improvements. Fig. 1, represents a plan or horizontal view, and fig. 2, a side elevation of my improved crane adapted as a warehousing, or what is usually termed a housing crane. Fig. 3, is a longitudinal section taken vertically through the middle of a crane for the same purposes, but varied in its construction from the preceding. Fig. 4, represents my improvements as adapted to quay cranes, or landing cranes; the same letters referring to corresponding parts, in these several figures; *a, a, a, a,* are the two side standards or frames, connected to each other by horizontal bolts or stretchers, and upon which the working parts of the crane are mounted; *b,* is the axle of the drum or barrel *c,* round which the draft rope or chain *d,* is wound in the act of raising any heavy body; *e, e,* are two wheels or circular rims affixed to the axle of the drum *c,* and by bolts through their arms to the drum itself; these wheels carry a series of friction rollers *f, f, mounted* on pins, projecting alternately on each side *of the rims of the* wheels, which may be secured in their places by nuts on the ends of the pins; *g,* is a four throw crank shaft, which turns in the swinging frame *j*; to each of these cranks is attached one of the levers *h, h, h, h,* with wedge formed ends, and the fulcrums of these levers are bolts *i, i, i, i,* in the tops of the rocking crutches *k, k, k, k*; these crutches have their bearings on one of the bolts or stretchers, con-

necting the side standards. At one end of the crank shaft there is a fly wheel *l*, to regulate the motion of the parts.

" On the power being applied to the cranks *g*, by the winch handles *m*, or by any other means, the cranks as they revolve towards the drum wheels project forward; the levers *h*, *h*, *h*, *h*, and their wedge-formed ends successively pass under and raise the rollers *f*, and when past their centres revolving from the drum wheels, the cranks depress the longer arms of the levers, and raise the shorter arms with the rollers, and thus successively drive round the rims, and with them the drum or barrel.

" To throw the machine out of gear, the ends of the levers *h*, *h*, *h*, *h*, must be withdrawn from the friction rollers *f*; to do this, the pauls *n*, *n*, must be removed from supporting or wedging up the back of the swinging frame *j*, by lifting up the handle *o*, on the shaft *p*, when the frame with the crank shaft and levers may be drawn back against a rest *g*, seen in fig. 3.

" The crank and levers being thus out of gear, the barrel is at liberty to turn the reverse way, for the purpose of lowering the weight suspended, and the velocity of the descent is to be regulated by a two-part break, as shewn in figure 1.

" When it is required to put the machine into action, the counter balance weight *r*, hung over the pulley *s*, by a chain or rope from the swinging frame *j*, will assist to bring the swinging frame up into its working position, when the pauls *n*, will fall down.

" Where it is desirable to have the draft rope or chain suspended, so as to raise the weight directly under the barrels without any gin wheel, or jib head, the shorter ends of the levers may be made with the wedge or inclined planes the reverse way to those already described, when they will by acting on the upper side of the rollers

force them downwards, and turn the barrel the reverse way to that already described.

" In fig. 3, the parts are the same as figs. 1, & 2, except that the levers *h, h, h, h,* work upon friction rollers *i,* turning on a cross stretcher, which friction rollers *i,* become the fulcrums of the levers *h, h, h, h,* instead of the rockng crutches before described.

" Fig. 4, is a side elevation, of the sort of cranes usually called a quay crane, with the several parts of my improvements, as applied in a vertical position; in this figure the break is shewn as acting on the outer edge of one of the wheels which carries the friction rollers, so as to keep the parts of the machine all within the frames.

" The frames in which this machinery may be mounted can be made of any form and size which the amount of power required in the crane, or any local causes may render advisable: and a crane may be made in this manner, by using two-throw, four-throw, six-throw, or eight-throw cranks, and correspondening wheels, with friction rollers on each side, to each pair of cranks and levers."

The specification proceeds to describe several modes of connecting these cranes with the working parts of engines of the same kind as ratatory and reciprocatory steam engines, which are to give out the mechanical power for working these cranes by means of compressed or condensed atmospheric air. One of these engines is called an *alternating rotatory* engine, which singular denomination is intended to express that the movements of the engine partake of both a rotatory and reciprocating action, that is, its piston is a vane turning within a cylindrical chamber upon an axle, and that it performs rather more than three-fourths of a rotation and then returns back again through the same arc, and so continues reciprocating in a circular course. The construction how-

ever of this, and the rotatory engine described, differ so little from rotatory steam engines, and particularly that invented by Mr. Wright and described in our twelfth volume (first series), page 57, and plate IV, that we do not consider it necessary to give a plate, or further explanation of the contrivance, and particularly so as the plan proposed of employing condensed air, as the actuating power, must be far from convenient, if at all practicable."—[*Inrolled in the Inrolment Office, February*, 1830.]

In our fourteenth volume we announced this invention, as one which *professed* to involve some new principle in mechanics, and having then witnessed its performance, were disposed to consider it as really a superior modification of mechanical powers, to those usually employed in the construction of cranes for raising and lowering heavy bodies. Much discussion took place upon the question by some of the scientific journals, our cotemporaries, who thought proper to ascribe to us expressions and opinions which we never uttered or conceived. Whether we were right in our views, appears still to be a question, on which we have only further to say, that the cranes put up by the Patentee at the West India Docks have from their commencement been worked by *four* men, while other constructions of cranes, exerting a similar power, are invariably worked by *six* men; and although the parties having the direction of them may differ in opinion, yet the fact stands uncontradicted.—EDITOR.

*To* FRANCIS WESTBY, *of the town of Leicester, in the county of Leicester, Cutler, for his having invented certain improved Apparatus to be used for the purpose of Whetting or Sharpening the Edges of the Blades of Razors, Penknives, or other Cutting Instruments.* —[Sealed 26th Nov. 1829.]

THE subject of this invention is a mode of mounting a hone or other oil-stone, designed for sharpening edge-tools; with certain appendages, as holders and guides: in order that a razor or other cutting instrument may be held and guided at a proper angle as it is passed over the oil-stone, and thereby obtain, with certainty, a correct cutting edge. The following is the

SPECIFICATION.

"My improved apparatus is intended to be used for whetting or sharpening the blades of razors, penknives, or other cutting instruments, which are usually whetted or sharpened by rubbing them upon the flat surface of stones called hones or oil-stones. By my apparatus the said blades are so guided that the cutting edge *must* apply to the surface of the stone at such an angle or inclination as is proper to whet or sharpen the said edge, and produce such a cutting edge as is required; and the apparatus insures that, when the blade is rubbed backwards and forwards upon the surface of the stone, it shall not deviate from that angle.

"Plate VIII, fig. 20, represents one form in which my improved apparatus may be constructed, shown in section, and fig. 21, is a horizontal plan of the same; *a*, *a*, is an oblong block of wood, in which the hone and the parts for guiding the cutting instrument are mounted. The wood is cut away at the middle part of the block, with a long deep notch to about two-thirds of its depth, and also a small cavity or chamber is cut in each end of the notch, shown by dotted lines in the plan, fig. 21.

" The notch or space excavated in the block receives the hone *b*, *b*, which is bedded with cement upon the bottom part; *c*, is a moveable plate of metal placed above the hone to apply to the back of the razor *d*, or other cutting instrument, in order to guide the blade and determine the angle at which its edge shall be applied upon the surface of the hone, when it is rubbed thereon in order to be sharpened. The guide plate *c*, is of the same breadth as the hone *b*, but rather longer, and the two ends of the plate, which extend over beyond the two ends of the hone, are supported by two upright screws *e*, *e*, which are fitted through holes in the bottom of the block of wood, their heads being countersunk within holes at the under surface of the bottom. The screws are passed through holes in each end of the guide plate *c*, and there are two coiled spiral springs of wire, embracing the screws acting between the underside of the guide plate and the bottom of the cavity.

" The elasticity of the springs tends to force the plate *c*, off from the surface of the hone, as far as the screws will permit; but, by turning the heads of the screws, the guide plate *c*, may be drawn down towards the hone, in opposition to the elasticity of the springs; or, by turning the heads of the screws the other way, the guide plate *c*, will be removed further from the surface of the hone; hence, by the screws *e*, *e*, the distance between the hone and the guide plate can be regulated at pleasure.

" The guide plate *c*, confines the back of the blade of the razor *d*, or other cutting instrument, from rising up too high above the surface of the hone, and thereby prevents the possibility of rolling the edge upon the surface of the hone when it is rubbed backwards and forwards, or forming the edge to a more blunt or obtuse angle than is intended to be given to it.

" The blade is inserted into the space left between the guide plate *c*, and the hone *b*, in the manner shown in the section, fig. 20, and the distance between the plate and the hone is adjusted by means of the regulating screws *e*, *e*, according to the thickness of the back of the razor, so that the back will

nearly fill up the space left between the guide plate and the hone.

"The sharpening is performed by holding the handle between the fingers and thumb, with a sort of twisting action, which will tend to raise the back of the blade upwards against the under side of the guide plate, and at the same time press the cutting edge downwards upon the surface of the hone; the force of that pressure being determined by the said twisting action given to the handle of the blade, and tending as it were to turn the blade and handle round about its length as an axis.

"The blade being thus held with a suitable degree of twisting force and pressure of the edge upon the hone, may be moved backwards and forwards over the length of the hone, and at the same time endways of the blade, so as to produce that sort of horizontal circular motion, which is usually given to blades during the operation of whetting on an oil-stone; that is to say, every part of the blade is made to describe a horizontal circle or oval curve; but this kind of motion for whetting is no way peculiar to my apparatus, for it may be used with any other kind of rubbing motion which is suitable for whetting the edges of blades.

"In case the blades of razors or other cutting instruments are made with the back sufficiently thick to give the edge the proper angle when the back is made to bear upon the stone as well as the edge, then the space left between the guide plate *c*, and the surface of the hone, must be only as much as will receive the thickness of the back, and allow it to move freely backwards and forwards; in such case, also, the blade may be held exactly in the usual manner to produce the requisite pressure of its back and its edge upon the stone, without bearing the back upwards beneath the guide plate, by the twisting action above described; the guide plate being in such case only a security that the thick back of the blade shall not by accident or inadvertence be raised up from contact with the stone. It is only blades with thin backs, requiring their

backs to be raised up from the surface of the stone, that the handle is to be held in the above-described manner with a twisting action, which will raise the back upwards in contact with the under side of the guide plate. Care must be taken to set the guide plate exactly parallel to the hone before commencing to use the apparatus.

"I have shown my improved apparatus at figs. 20 and 21, fitted with an elastic strop *f*, *f*, which is formed of an endless band of leather, encompassing two small stretchers *i*, *j*, which extend across the breadth of the strop within the loops formed at its two ends. The strop is supported by two small studs, which turn up from the ends of two plates of metal, which are screwed on each end of the block of wood. A pin projects out from the stretcher, and passes through the leather of the strop at one end, and is lodged in a hole in the stud. Two rods or strong wires are fastened to the stretcher, and extend parallel to each other, all the length of the strop withinside of it. The other ends of these wires pass through holds in the other stretcher *j*, and in the leather of the strop, and the extremities of the wires are fixed into a small bar, which presses against the stud, and a screw *k*, is inserted through the cross bar, which screws into the stretcher *j*, within the end loop of the strop: the shoulder of the screw bearing against the outside of the cross bar. By turning the screw *k*, the strop *f*, may be strained to such a tension as to render it a sufficiently firm surface for stropping the blade of a razor.

"The shoulder or round shank of the screw *k*, is received in a notch formed in the stud, and left open on one side, in order that the screw may be displaced sideways out of that socket, and then the pin at the opposite end of the strop may be drawn out of the stud, and the strop be entirely removed. It may be replaced with the other side upwards, or it may be used in the detached state.—*Note.* Such strops having been heretofore made form no part of my invention, and are only represented and described here to show how they are applied in concert with the apparatus which is my invention.

" Figs. 22 and 23, represent another form in which my improved apparatus may be constructed; fig. 22, is a section of the apparatus; and fig. 23, is a plan of the block. In this construction the object is the same as the preceding, viz. to guide the blade of the instrument which is to be sharpened, and to prevent the back from being raised too high off the surface of the hone. But instead of the hone being fixed, and the guide plate being caused to approach to, or recede from the hone by the regulating screws, in the manner hereinbefore described, the guide plate *c*, is firmly fixed by screws to the top of the block, so as to cover over the notch therein; and the hone *b*, is cemented and held fast by screws to a bed plate *g*. *g*, which is supported by the upright screws. The heads of those screws are countersunk into holes in the bottom of the block, and are screwed into the bed plate.

" The hone *b*, and its bed plate *g*, are forced up towards the guide plate *c*, by a long bent spring *h*, which is screwed by the middle of its length to the bottom of the notch in the block *a*, and lies interposed between that bottom and the underside of the bed plate, the two ends of the spring bearing the same upwards, by its elasticity, in opposition to the screws.

" The space between the hone *b*, and guide plate *c*, can be regulated by turning the adjusting screws, and causing the plate *g*, to rise or fall until it is set at the required distance. The spring *h*, must be made strong enough to prevent the hone yielding at all to the pressure requisite for sharpening the edge of the instrument properly.

" This apparatus is also furnished with a strop, which is strained and supported by screws mounted in studs formed at the ends of the guide plate, which turn up for that purpose; and the strop can be tightened or slackened, or entirely removed by means of those screws, as is sufficiently obvious.

" Instead of adjusting the guide plate by means of two regulating screws, as shown in fig. 20, it may be placed, as shown in fig. 24, being guided at each end by a pin on which it can

slide up and down loosely. Two springs are interposed between the guide plate *c*, and a fixed plate, screwed on the top of the wood block *a*, over the notch. The place of the guide plate is adjusted by a screw, which is rivetted into the plate *c*, and passes up through a hole in the fixed plate, and a nut is applied upon the screw, where it comes up through the plate. By turning the nut the guide plate *c*, may be drawn up from the hone, or be caused to approach the hone.

" The construction of my apparatus may be varied, by using two hones with their surfaces placed opposite to each other, the second hone being fastened to the guide plate *c*, so that the back of the blade may apply thereto, instead of to the guide plate as above described. In this way the edge may be turned upwards, in order to sharpen it against the upper hone, the lower hone then serving as a guide to the back of the blade, to ensure that the edge shall be applied at a proper angle to the surface of the upper hone, in the same manner as the upper hone serves as a guide for the back when the lower hone is used. And when two hones are so disposed opposite to each other they may be chosen of different qualities, one being a coarse hone or oil-stone to sharpen a thick edge, and the other a finer hone to finish a fine edge.

" If the guide plate *c*, is made of soft yellow brass, it will, in some cases, be found to give a finish to a cutting edge after it has been finished on the hone to turn it upwards and rub it against the surface of such brass guide plate, in the same manner as it was before rubbed upon the hone, the edge being well supplied with the black oil which gathers upon the hone whilst it is rubbed up the brass plate.

" Although I have described my apparatus with regulating screws to adjust the space to be left between the surface of the hone and the surface of the guide plate, it is to be observed, that such regulation is only necessary in order to adapt my apparatus to whet or sharpen blades of different breadths and thicknesses at the back, and, therefore, when my apparatus is

to be made for sharpening only one particular blade, or one particular size of blades, the guide plate may be immediately fixed at a suitable distance from the hone, whereby my apparatus will be simpler in its construction, but the same in effect, for sharpening the particular blades for which it is made.

" Figs. 25, 26, and 27, represent another form in which my improved apparatus may be construed; fig. 25, is a perspective view; fig. 26, a section; and fig. 27, a horizontal plan thereof. Two hones *b*, *b*, are received in an upright box *a*, which is mounted upon the larger box *d*, for a base; the hones descend through the box *a*, and also through the top of the box *d*, which has two oblong holes or slits cut out in it to receive the hones; the narrow piece of metal which is left on the top of the box, between those oblong holes, divides the hones *b*, *b*, and a double spring, in the form of the letter u, is inserted between the two hones. The two prongs of the double spring bear against the adjacent sides of the holes, and, by their elasticity, tend to force the hones away from each other.

" The hones *b*, *b*, stand upon a bearing plate *e*, which is supported by a screw *f*; the head is countersunk within a hole in the bottom of the box *d*, and the screw is screwed into the plate *e*, and the upper end enters into a hole in the top of the box *d*, whereby the screw is guided and kept perpendicular; a washer is fastened upon the screw, just above the bottom of the box, so that the screw cannot itself rise or fall within the box; but, by turning it round, it will raise up or depress the plate *e*, and the hones *b*, *b*, which rest upon that plate, so as to bring a new part of the length of the hones into action when that which has been used has become worn.

" The hones can be caused to approach each other in opposition to the elasticity of the double spring, by means of adjusting screws, which pass through the metal of the box *a*, and bear against the backs of the hones.

" A grooved trough *h*, *h*, is mounted upon a standard *g*, on on the top of the box *d*, by means of a round plug, which is

formed on the underside of the trough, and inserted into a cylindrical hole in the standard; so that the trough can be directed towards any part of the space between the two hones *b*, by turning the plug round horizontally in its socket; and it can then be fixed in the standard *g*, by the thumb-screw.

"The end of the trough nearest to the hones may be adjusted by regulating screws, which are screwed through the ears of the small bracket *i*, which is fixed to the outside of the box *a*, whereby the trough can be placed in the required position with respect to the space between the hones, and retained between the points of the screws from any considerable deviation from that position; but it is desirable to leave the trough with a little liberty to play about its plug.

"The razor or other blade which is to be sharpened, is fixed in a small clamp *k*, between the two screws *l*, *l*; a stud, which projects from the lower part of that clamp, is fixed upon a cylindrical rod *m*, which lies in the bottom of the trough *g*, and is adapted to be slidden endways, backwards and forwards. The clamp *k*, is formed so that when it is quite vertical, its lower edges do not touch either of the edges of the trough; and then if a blade is fixed in the clamp it will pass clear between the hones *b*, *b*, without touching either of them; but if the rod *m*, is turned to one side or the other, the clamp will be tilted over, so that one of its bottom edges will bear upon the corresponding edge of the trough, and then the blade which is fixed in the clamp will also be tilted over to one side, and its cutting edge will be brought in contact with one of the hones.

"Care must be taken to adjust the position of the trough *h*, so that when the clamp is tilted over to one side or the other, the cutting edge of the blade shall be brought exactly in contact with the corresponding hone at the proper angle, with the surface thereof for sharpening, and no more; and the adjustment may be attained with great accuracy, by means of the several regulating screws hereinbefore mentioned, viz. those which act upon the

stones, those which regulate the trough, and also those which hold the blade in the clamp.

"When the apparatus is adjusted the edge is sharpened by drawing the blade backwards and forwards in the direction of its length, with its edge in contact with one or other of the hones, the angle and direction of the blade being guided during such motion by the bearing of one of the bottom edges of the clamp upon the corresponding edge of the trough; the clamp being tilted alternately to one side or the other, in order to bring the blade into contact with each hone in turn.

"The clamp is intended to hold razors and large blades; but for penknives or blades of a small size, a smaller clamp *r*, (shown detached) is fixed into the clamp *k*, and that small clamp is provided with its own screws to fasten the blade into it.

"Having now described my apparatus, I do hereby declare, that what I claim as my invention, under the said letters patent, is the improvement of applying and fixing a guide plate, as hereinbefore described, over or opposite to the surface of such a hone or oil-stone as is or may be used for whetting or sharpening the blades of razors, penknives, or other cutting instruments; leaving only such a space or interval between the adjacent surfaces of the stone and of the said guide plate as will confine the back of the blade from being raised up any higher from the surface of the stone than is proper to give the edge the desired angle. Also, in applying two stones with their surfaces opposite to each other, and at a suitable distance apart, in order to whet or sharpen the cutting edge, first, on one side by one stone, and then on the other side by the other stone. And as to the particular modes hereinbefore described, of adjusting the distance or space between the stone and the guide plate, or between the surfaces of the two stones; and also the means of holding and guiding the blade during the motion which must be given to it, during such whetting or sharpening, the same may be greatly varied without departing from the nature of my invention as here set forth."—*(Inrolled in the Inrolment Office, January,* 1830*)*

*To* JOSEPH ANGE FONZI, *of Upper Marylebone Street, in the county of Middlesex, Esq. for certain Improvements or Additions to Fire-places.*—[Sealed 9th September. 1829.]

THE subject of this Patent is a peculiar construction of stove for heating rooms, and also for culinary purposes; one particular feature of which is, that by the arrangement of the parts, the fire is intended to burn downwards, and, consequently, to consume the greater part of its own smoke. The following is the Patentee's description of the invention:—

SPECIFICATION.

"My improvements on, or additions to, fire-places consist in giving to fire-places the form or forms hereinafter described, and also represented in the drawings hereunto annexed, in order that fire-places, constructed according to my improvements, may be adapted to burn coals by a downwards current of air and flame, so as to avoid the escape of smoke or vapour into the apartment in which such fire-places are placed.

"Description of the apparatus for the burning of coals, which is to be made of iron or any other suitable substance—I name it a '*Fonzienne.*' The form and dimensions may be varied at the discretion of the workmen who are to construct the same. I have adopted the following form and dimensions:—

"The fire is contained within a cast-iron box, without a lid or a bottom. It is fifteen inches square in the inside, thirteen inches high, and the metal two-thirds of an inch thick. (See Plate VIII. fig. 1.) At the lower part of the front side of the box is an opening, for the purpose of

introducing a shovel to take out the ashes. This opening might be dispensed with, but it would then be necessary to take out the ashes at the top, which would be much less convenient. This opening is to be shut by a small door during all the time that the fire is burning. At the back part of the box there is a circular opening, six inches diameter, its centre being five inches above the lower edge of the box; to this opening the pipe or flue is joined to carry away the flame and smoke into the chimney.

"This box is placed (as shown at fig. 2,) on a pavement, composed of square cast-iron plates, two-thirds of an inch thick, which forms its basis or foundation, and supplies the place of the bottom to the box. Those iron plates may be dispensed with, it being possible to place the said box upon the chimney hearth, on a pavement of bricks or stone-work. Within the interior of the box I adapt a frame of cast iron, with four short legs resting on the bottom plates or pavement, the outside of the frame touching all the interior sides of the box. On this frame rests the horizontal grate, which is of the same size as the frame, and fills the box. The grate must be one inch in thickness or more. (Fig. 3, representing the frame, and fig. 4, the grate resting on the frame.)

The top of the grate is five inches above the basis, but it may be placed higher in the box, the height of the frame which supports the grate being made accordingly. On this horizontal grate another grate of the same thickness is placed, nearly vertically within the box, so as to stand sloping against the inside of the box, being joined to the superior edge of the posterior side or back of the box, in which side is the opening of the flue through which the smoke and flame are to pass away. The superior edge of this grate must join closely to the superior edge of the back of the box, but the inferior edge of the grate is

kept about two inches and a half distant from the back of the box, by means of two short legs, which project out behind the grate, and touch the back, so as to make this interstice (fig. 5.), indicating this said grate, which stands nearly vertical. Or, instead of that grate, a plate of cast iron of the same thickness and size (shown at fig. 6), may be substituted, being placed within the box, in the same manner as above described; and other grates of the same construction may be adapted to stand in sloping positions against the four inward sides of the box (as fig. 7).

"The said plate of iron, which may be used in lieu of the back grate, and the number of the sloping grates which may be so applied within side of this box, serve to vary, at pleasure, or, as need may be, the quickness and intensity of the combustion of the coals contained within the box which forms the fire-place. The most active fire may be obtained by using the plate of iron at the posterior side of the box as aforesaid.

"If, instead of this plate of iron, a grate is used, then the consumption of the coals is less active; and it will be still more moderate if a second sloping grate is applied against the front internal side of the box, above the opening for removing the ashes; but the smallest fire is made by using all the four sloping grates hereinbefore mentioned against the four internal sides of the box; or the sloping plate of iron may be applied against the posterior internal side of the box in which is the opening for the smoke pipe (or flue), whilst three other sloping grates are applied in the other sides. In this case the plate of iron must be formed as represented by fig. 8. By these means any required degree of heat may be procured, either for a large or small kitchen, or for a large or small apartment.

"The draft or current of air which causes the fire to burn draws downwards through the burning fuel (and through

the bottom grate upon which it rests) into the space beneath that grate, from whence it passes away by the smoke-pipe or flue, which is joined to the opening at the back of the box, and which conducts the smoke into the chimney.

"To obtain every possible advantage from this fire-place it will be necessary to make the following additions to the said apparatus, viz.:—To the four superior edges of the box is adapted a square border-plate of cast iron, extending out around the fire-place, nine inches broad or more on every side. The border-plate is fastened on the edges of the box by screws, and it serves to support all the culinary utensils, pots, saucepans, &c. which had been previously placed on the burning fire, for boiling or stewing. When situated on this border-plate they will still continue to boil; *a, a,* represents the border-plate. A suitable frame, like a stool, with legs, must be placed behind the box, at the back where the smoke-conducting pipe is joined to it. This frame must be of the same height as the box, and must touch the posterior edge of the border-plate. This frame is to support a reservoir or boiler, to contain water. The boiler may be made of copper, or any other metal, fourteen inches or more wide, one foot eleven inches high, and two feet long. A pipe of copper, five or six inches in diameter, open both at the top and bottom, passes vertically through the boiler, and is soldered to the middle of the top and bottom plates of the boiler, where it passes them. The top of the pipe rises up ten inches above the top of the boiler. At the lower part of this boiler is a cock to draw off the contained water, and at the top a hole to pour in fresh water. The lower end of the vertical pipe through the boiler joins by an elbow-turn to the opening at the back of the box where the smoke escapes, and the heat, which is, in

consequence, conveyed through the pipe, is communicated to the surrounding water. The superior extremity of the said vertical pipe, where it rises above the top of the boiler, enters into an oven, composed of copper or iron plates, about two feet square, and one foot high. This oven contains another smaller oven withinside of it, in the manner of a drawer, leaving between them an interstice of two inches on all sides, except the front, where the door opens into the oven.

"In the centre of the upper part of the exterior oven is a hole, five or six inches in diameter, to which is adapted the conducting pipe, for conveying the smoke away to the chimney, the flame smoke and heated gas emanating from the burning coals contained in the fire-place, pass through the elbow-turn, at the back of the box, into the vertical pipe through the centre of the boiler, making the water within it boiling hot. Then the smoke passes into the interstice around the interior of the two above-mentioned ovens, and from thence through the superior conducting pipe into the chimney. (See *b*, fig. 2, representing the boiler or reservoir; *c*, the cock; *d*, the opening by which the boiler is filled; *e*, the vertical pipe which passes through the boiler *b*, the oven *f*, and the conducting pipe *g*, for the smoke.)

"The fire-place may be elevated to a more suitable height, so as to save the trouble of stooping, by placing the whole apparatus on a basement of brickwork, or supporting it on a suitable frame. In that case the part of the vertical pipe which is between the boiler and the oven may be removed, and the oven placed on the boiler, that the oven may not be too high from the ground.

"The apparatus may be constructed in a different manner, as follows:—The box to contain the fire may be made one foot and a half long, one foot wide, and one

foot high; the metal two-thirds of an inch in thickness. A frame and horizontal grate is fitted into this box in the same manner as in that before described, also the door in front to remove the ashes; but there is no opening at the back for the smoke-pipe. The back plate, which has been before called the sloping plate (or the grate which is to be used in lieu thereof), is to be placed vertically at a distance of six inches from the posterior side of the box, leaving a space of one foot square to receive the burning fuel, and a space of six inches by one foot behind the plate or grate, for the flame and smoke to ascend in, after having passed down through the burning fuel and the bottom grate. Over this latter space is placed a box, one foot long, and six inches wide; the height at pleasure. It is open at the bottom, but closed at top, and receives the smoke and flame within it. To the posterior part of this box is adapted a conducting pipe. Fig. 9, represents the box; *h*, the space between the vertical grate and the posterior side of the box or fire-place. Fig. 10, is the upper box; *i*, the opening to join to *k*, the conducting pipe for the smoke. Fig. 11, is the whole apparatus put together.

"Another construction for the same apparatus is shown at fig. 12. Instead of covering the posterior part of the apparatus with the upper box it may be covered with the border-plate, which will extend itself around all the superior edges of the box, and cover over the space of six inches intended for the smoke to ascend in. Over the middle of this space of six inches a vertical column, five or six inches in diameter, and three feet high, is placed on the border-plate, and conveys the smoke upwards. On the top of the column the oven is placed as before described. The heat will pass up through the column into

the interstice between the two ovens, and from thence will escape by the upper conducting pipe into the chimney.

" Another manner of constructing the apparatus. If two of these apparatus are required to burn at once, they may be placed one by the side of the other in contact, and, instead of placing an upper box on each, one upper box, two feet long, may be placed across over both, as in fig. 13, to receive the flame and smoke arising from both, and from that long upper box it may pass through a single conducting pipe, joined to the middle of the posterior part of the upper box. On the two apparatus which are so placed side by side, instead of an upper box may have two vertical columns placed on their border-plate, over the spaces in which the smoke rises. In this case the oven must have two holes to receive both columns, as in fig. 14. If two apparatus so placed side by side are required to have a boiler behind them, that boiler may be about double the breadth of the boiler hereinbefore mentioned, or larger; and it must have in its inside two vertical pipes, which will enter in the two holes made in the oven instead of the columns, as fig. 15. The said apparatus, whether single or united, must always be surrounded by the border-plate on the top edge, and the sloping or vertical plate of iron, or the sloping or vertical grates like those in the first-mentioned apparatus, are to be used to procure all the required degrees of heat.

" To make use of the said apparatus fill the interior of the box with coals, and cover the upper part either with a cover-plate, divided into two, or else with two kettles of water, which, when set side by side on the coals, will cover over the upper part of the box; leave uncovered a small part of the coals between the two parts of the cover, or the two kettles, and in that opening put a shovel full of burning charcoal, or of lighted wood, which will set the

coals beneath it on fire. As they kindle push aside the divided cover, or the two kettles from each other, and, when the whole of the coals are on fire, take away the covers or the kettles, and the fire continues, without occasioning the least smell or smoke, because the current of air is drawn downwards through the whole mass of burning fuel, and, after passing down through the bottom grate, rises up again in the space left behind the sloping plate or sloping grate, and from thence the smoke passes away through the conducting pipe to the boiler and the oven, and ultimately to the chimney. Fig. 16, shows the covers, fig. 17, the kettle.

" After having tried experiments with this said apparatus I have found the following alterations advisable to adapt it to different purposes:—For the simple warming of rooms the apparatus represented in fig. 11, may be made sixteen inches high at the posterior part, and only nine inches high in the front part, so as to make the top edges of two sides of the box with a slope towards the front side. The sloping must begin at a distance of six inches along the lateral edges from the back of the box, in order that so much of the said edges as are to be covered by the upper box, as fig. 13, may remain in a horizontal plane; and all the rest which is left open for the fuel is inclined, so that the burning fuel will lie higher at the back than at the front.

" This apparatus, like the others before described, with the upper edges horizontal, is open at bottom, and is intended to be placed on the floor; but it must have a bottom plate of the same size as the bottom of the box, and one-third or half an inch larger all round, for a raised border, into which the lower edges of the box are fitted. This bottom plate is to be of the same thickness as the box, or a little more. The raised border must be inter-

rupted in the front part before the door at which the ashes are to be withdrawn, in order that the door may be put in and taken out easily. The edge of the bottom plate must advance at least one inch forward in front of the opening of the door. This bottom plate may be raised from the floor by means of legs, or any other method, so that the air, in circulating under the bottom plate, will prevent the fire from over-heating the pavement or plates of iron under the box, or from communicating fire to any beam or wood work which may be underneath that pavement.

"The divided cover-plate for the apparatus to inclose the coals when the fire is first lighted may be made in various forms, more or less ornamented. The superior edges of the said apparatus may be surrounded by a border-plate, of a square or an oval shape, of the same size internally as the interior of the box or fire-place. (See fig. 18.) And to the external part of this border-plate, and also to the sides of the box, lugs or projections may be added, to fasten plates of iron or copper to, by screws, the size of such plates being according to the dimensions of the chimney, which may be ornamented by such plates in any style of elegance or taste required. The border-plate itself may be of iron or of brass, gilt or varnished, not being subject to be blackened by the smoke or coal dust, which can never affect it.

"To procure suitable intensity of combustion and of heat in the last-mentioned apparatus, a sloping grate, of the kind hereinbefore described, may be inserted into the posterior part of the box, resting upon the horizontal grate, and joining to the superior edge of the back of the box, but detached from that back at the bottom part of the sloping grate, like the other sloping grates already described. Likewise two other sloping grates may be placed in the sides of the box, joining at the top to the

edges of the box, and at the bottom to the bottom grate. The latter sloping grates must not extend the whole length of the inside of the box. It is enough that these grates are half or two-thirds of that length.

" To make the most of the heat which radiates around all the apparatus described, a frame, one foot high or more must be constructed, and a wide and thick platform put upon the frame, the box or fire place must be placed in the centre of the platform, and then the other bottom plate to the box may be dispensed with. The box must have its border plate fixed around its superior edge, as before described. The apparatus thus placed on a platform, is at a suitable height for all domestic purposes. The boiler may be placed on the posterior surface of the border plate, making the conducting pipe for the smoke and flame pass through the border plate, and fit into the vertical pipe within the boiler; that pipe rises a little above the boiler, that it may also fit into the iron case containing the oven, which may rest on the boiler.

" The height of the frame for supporting the apparatus, and of the frame for the boiler, and the oven at the top of the boiler, must be such that the cook may perform the various operations with ease. If it is desired to keep the whole of the border plate disengaged, a large frame must be placed on the floor, at the posterior part of the apparatus, the frame being of the same height as the posterior edge of the border-plate; the boiler is to be placed on this frame, and on the boiler the oven is to be placed.

" The oven that is applied to each apparatus, must be of a size in proportion to the quantity of fuel contained in the apparatus; the interstice between the iron case and the oven that is included within the case, must be two inches wide, or a little more.

" If it is requested to keep the oven always hot, even when the fire has decreased, then the interstice must be more than two inches wide, and the case must be lined with tiles or brick work within side. These refractory and slow conducting materials will keep in the heat a long time; and the fire being kept up, though not so strong as at first, will maintain more than sufficient heat in the oven for baking pastry or roasting meat.

" When two apparatus are to be joined side by side under one large border-plate, the boiler may be placed thereon, that boiler having in the inside of it two vertical conducting pipes; or it is still better to place the boiler on a larger frame at the posterior edge of the boiler plate, as before stated, for a single apparatus; or if the boiler has only one vertical pipe through it; the apertures for the smoke and flame at the posterior side of each apparatus, must be adapted to the two branches of a forked pipe, running into one pipe, the top end of which fits into the bottom vertical pipe of the boiler.

" The boxes or fire places of the apparatus may be constructed in any form or size, besides those hereinbefore stated, but the capacity to contain coals must have its limits, for if excessive, the grates and the iron plates, and the internal frames, may be injured by excess of heat. The box must not be too small, or it will be unsuitable, for it should contain a sufficient quantity of coals to continue burning a long time. If the capacity is too small, the fire will go out when it becomes abated by too early a consumption of the coals.

" The horizontal grate, fig. 4, before mentioned, as being placed inside the box or fire place fig. 1, near to the bottom thereof, as well as the frame, fig. 3, to support the horziontal grate, may be dispensed with, by making horizontal rows of holes, about one inch and a half dia-

meter, through two opposite sides of the box, at three inches and a half above its base, and at such distances apart as to leave spaces of about one-third or half an inch of solid metal between the holes; and inserting into those holes cylindrical bars of wrought or cast iron, of the same diameter as the holes, and extending horizontally across the inside of the box, in order to sustain the burning fuel, in lieu of the bars of the horizontal grate, which, as before mentioned, is laid aside. These bars will resist the action of the heat for a long time, and when after much use they become damaged at the part within that side of the fire place where the heat is most considerable, they may be removed, and others applied in their stead. It is not absolutely necessary to make holes through the sides of the box, in order to insert such cylindrical bars, for they may be lodged on two supports, as fig. 19, at the bottom part of the lateral sides of the interior of the box; or instead of solid cylindrical bars, I make use of hollow cylindrical tubes of cast or wrought iron, through which the exterior air may pass in a current, which produces the double effect of cooling and carrying off the excess of heat caused by the combustion at the bottom of the box or fire place, and consequently the slackening of the burning of the fuel therein contained. Also the heated air which issues from the open ends of those tubes, will give heat to any articles which are placed opposite thereto, and by rising up beneath the platform gives heat thereto, and to any of the vessels that may be placed thereon, in order to keep the contents thereof boiling, as before stated.

" To increase or diminish the temperature of apartments which are warmed by my apparatus, the ordinary chimney of the apartment, which is closed at bottom, in order to cause a draft or strong current of air through

my apparatus, should have a valve or sliding damper, or ventilator applied in it at the lower part of the chimney, where it is shut up, so as to open a passage for air, and to open more or less passage at pleasure, in order to draw the air from the apartment up the chimney, and thus change the air and diminish the temperature of that which remains.

In building new houses, where it is intended to use my apparatus, I recommend the following plan, in lieu of the usual brick chimneys. A niche or hollow place should be left in the wall within side the house, and extending up through all the height thereof, from the kitchen to the highest story. Into this niche in the wall, which may be one foot and a half wide, and six or more inches deep, a hollow rectangular tube or funnel of cast iron should be adapted, so as to fill the niche; the said tube being made in convenient lengths, joined one to another, end to end, so as to make a continuous funnel up from my apparatus to the highest apartments, and the smoke-pipe of my apparatus being joined into the said cast iron funnels, (instead of being joined into the ordinary chimney, as before directed) the smoke, heated air and flame from the fire, will ascend through the said metal funnels, and heat will pass through the metal thereof, so as to give some warmth to the air contained in all the apartments that are situated above, that where my apparatus is placed, without the necessity of making a separate fire in each oven, and thus the danger of accidents from fire will be avoided.

" In order to clean out the inside of these iron funnels, small doors must be made in the front at suitable distances one from the other; such iron funnels may also be substituted for the chimneys as now constructed.

" Having now described my apparatus, and some of the

variations that may be advantageously made in construction thereof, to adapt it for different purposes, I do hereby declare that what I claim as my improvements on or additions to fire places is the internal arrangement of the parts of my apparatus hereinbefore described; the object of that arrangement being for the purpose of applying the known principle of supplying the air which is to support the combustion of coals at the upper surface of the fuel, with a descending current through the mass of burning fuel, by virtue of which internal arrangement I am enabled to regulate the degree and rapidity of the combustion of the fuel, and apply the heat evolved by the combustion so effected by the downwards current to all domestic purpurposes, without allowing smoke or smell or dust to escape into the apartment in which the apparatus is placed."—*(Inrolled in the Inrolment Office, March,* 1830.*)*

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*To* THOMAS ASPINWALL, *of Bishopsgate Churchyard, in the City of London, Esq. in consequence of a communication made to him by a certain foreigner residing abroad, for an improved method of casting printing types by means of a mechanical process, which invention he proposes to call the Mechanical Type Caster.* —[Sealed 22d May, 1828.]

THIS invention is a machine for casting printing types, in which the several parts of the mould are moved by mechanism, instead of being opened and closed by the fingers of the workman. The whole of the invention is described by the accompanying drawings (see Plate VII.) and following description.

SPECIFICATION.

"That is to say, fig. 5, is a plan or horizontal view of the machine or apparatus, when the parts of the mould have been

withdrawn from the melting pot, and are separated, after having cast and delivered a type. Fig. 6, is another plan view of the machine, when the parts of the mould are brought together, and closed previous to receiving a jet of hot metal from the melting pot to cast another type: fig. 7, is a side view of the same, (the melting pot and furnace being shewn in section,) fig. 8, is a front view of the mould when put together, with the parts by which it is connected to the machinery: fig. 9, is a top view, and fig. 10, is a side view of the same. The same letters and figures of reference refer to similar parts in all these figures; *a*, *a*, *a*, *a*, is the metal bed or swinging table, upon which the working parts are mounted, and which is suspended by the wires and swivel adjusting screws, *b*, *b*, *b*, *b*, as shewn in fig. 7; *c*, is the crank shaft, through which motion is communicated by the winch handle *d*, to the whole of the working parts of the apparatus: *e*, *e*, are the parts of the mould, in which the type is cast; *f*, is the melting pot, with the furnace *g*, under it. On motion being communicated to the handle *d*, in the direction of the arrows; the crank *h*, moves the connecting rode *i*, sliding bar *j*, *j*, and cross bar *k*, *k*, forwards, towards the melting pot.

"On each end of the cross bar *k*, *k*, are attached one end of each of the barrel springs *l*, *l*, their other ends being connected to the sliding carrier pieces *m*, *m*, *m*, on which the parts of the mould *e*, *e*, are mounted. As the cross bar *k*, *k*, is moved, the springs *l*, *l*, draw the carrier pieces *m*, *m*, and the parts of the mould *e*, *e*, forward, until they meet the pieces *m*, *m*, being guided by the ribs *y*, *y*, and keep them in close contact during the further operation of the machine, the screws *n*, *n*, which keep the carrier pieces *m*, *m*, down upon their bearings on the table, working in grooves or slits; the continued movement of the crank projects the sliding bar *j* further forwards, the cylindrical part of the bar sliding through the guide collar *o*, which is kept central to the machine by the pieces *p*, *p*, each connected by joints at one end to the collar, and at the other end to the carrier pieces *m*, *m*. On the end of the sliding bar *j*, is the upright piece *q*, (see fig. 7,) carrying the projecting piece *r*, which, as it is moved forward, coming in contact with the adjusting screw *s*, on one end of the

bent lever *t*, causes it to turn on its centre, and by the friction roller on its other end forces down the piston or plunger *u*, thus pressing the hot metal out of the cylinder *v*, into the chamber *w*, and forcing out that previously in it, through the small pipe or nozzle *x*, into the mould, as it is moved forward, to receive it by the friction roller 1, of the cam, on the crank shaft *c*, acting against the upright piece 2, fixed in the frame or table 3, 3, 3.

"The swinging table, *a*, *a*, being thus projected forward, until the end of the nozzle *x*, enters the mouth of the mould, which receives the jet of metal as it is projected out of the chamber, and the type is cast. The handle *d*, is then moved the reverse way, and the friction roller 1, ceasing to act against the upright piece 2; the table is allowed to swing back into its former position from the manner in which it is suspended out of the perpendicular and horizontal position. The piston or plunger is then raised by a spring from which it is suspended by the wire 4, but which is not shewn in the drawings, and it is prevented from rising too far by the stud 5, coming against the guide collar 6, (see fig. 7,) and as it rises the hot metal in the melting pot is allowed to enter the cylinder through the holes formed around its top, which are closed by the piston as it descends, thus preventing the metal from getting out of the cylinder *v*, in any way, but in the chamber *w*.

"The movement of the handle being continued, the sliding bar *j*, *j*, and all the parts fixed thereon, move backwards into their former position, as shewn in fig. 5, and the parts of the mould separate. On the upright piece *q*, is affixed another projecting piece 7, which carries the hanging tooth 8, and which tooth, as they retreat, slides in the groove 9, acting upon the bent lever 10, depresses it; the other end of this lever acts upon and raises another lever 11, (see figs. 9 and 10); this lever has an adjusting screw 12, pressing upon one end of the matrix 13, which is thus disengaged from the type; the spring 14, which keeps it in its place during the operation of casting, giving way to the pressure. On the mould opening, the cast type is loosened from that part of the mould to which it adheres by the inclined plane piece 15,

fixed in the swinging table acting upon the end of the rod 16, (its head being countersunk in the side of the mould plate), and projecting it forward, loosens the type and its cast. Jet *z*, which falls away below the spring 17, attached to one end of the rod 16, draws the rod back again, when the parts of the mould are made to close, it having again passed by the inclined plan piece 15. In order that the parts of the mould attached to the carrier pieces *m*, *m*, may move forward toward the melting pot, with the same speed, and meet together without striking, the regulating angular piece 18, is attached to the sliding bar *j*, *j*. Upon the angular sides of this piece the adjustable studs 19, 19, affixed on the carrier pieces *m*, *m*, act and govern the force of the springs *l*, *l*.

" When different sizes of type are to be cast, the mould is altered in the usual way, and, in order to accommodate the machinery to such adjustment, the pieces 20, 21, which connect the parts of the mould to the machinery, can also be moved. On the under side of the piece 20, is a groove (shewn by dots in fig. 9,) fitting on to a projecting rib on the carrying piece *m*, *m*, and this piece and the parts of the mould connected to it by the bolt and nut 22, can be moved nearer to, or farther from the centre of the machine, as the size of the type may require by loosening the screws 23, 23, which work in slits, and allow it to slide along the rib. The other half of the mould is connected to the piece 21, by a bolt and nut 22, in the same way as the former; but as it must be adjusted to the other half, there is no groove or rib, but on the carrying piece *m*, is the fixed piece 24, and its adjusting screws 25, 25, which, when this half of the mould is properly adjusted to the other, are to be screwed up tight, to prevent the piece 21, from getting out of its proper position, it being fixed down upon the carrying piece by the screws 26, 26, in the same way as the piece 20

" In order to regulate the height of the mould and swinging table, the suspending wires *b*, *b*, are furnished with adjusting screws and swivels, by which the inclination or height of the mould and table may be made to suit the type to be cast.

" The distance which the swinging table is to move backwards

and forwards, is regulated by the upright piece 2, which can be moved further from or nearer to the crank shaft, by turning the screw 27, which works in the female screw 28, and sliding piece 29, on which the upright piece 2, is fixed. The swinging table is made to move centrally to and from the nozzle of the melting pot, by the ribs on its under sides working between the adjusting screws 30, 30, mounted upon the stationary table 3. Round three sides of the nozzle *x*, of the melting pot, there is a guard piece 31, (see fig. 7,) which prevents the hot metal from flying about, on the jet being thrown into the mould, and also causes the extra metal to fall into the dish 32. To prevent the handle *d*, from being moved too far either way, the bridge piece 33, is fixed upon the table, which prevents the connecting piece *i*, from rising too high, and consequently the handle from being turned too far either way.

"When it is wished to move the swinging table and parts connected to it from the melting pot, the upright piece 2, is to be removed, and the table will swing back into the perpendicular position."

"I do not hereby intend to claim, as my invention, any of the parts separately, or which are already known or in use, but the improved method of casting printing types by means of the mechanical process and arrangement of machinery herein described I particularly claim, and more particularly the manner of suspending the swinging table out of the horizontal and perpendicular position. The mode of moving the table with the parts of the mould towards the melting pot. The manner of bringing the parts of the mould together, and keeping them closed during the operation of casting the type. The mode of putting the working parts in operation through the crank shaft, assisted by the other parts described. The manner of adjusting the parts of the mould and apparatus, and also in using the chamber *w*, through which the hot metal passes from the cylinder *v*, into the mould, all of which form part of my improved method of casting printing types.

Specification drawn by Mr. M. Berry.

*To* LEMUEL WELLMAN WRIGHT, *of Mansfield Street, Borough Road, in the county of Surrey, Engineer, for his having invented or found out certain Improvements in machinery for cutting Tobacco.*—[Sealed 21st August, 1827.]

THE construction of this engine bears a close resemblance to the machines with revolving knives employed for cutting straw into chaff. The tobacco intended to be cut, after being pressed into cakes in the usual way, is placed upon a smooth bed within a horizontal trough, and pressed on the top by a follower and screws to keep it compact. The cutters are formed by blades or scythes, mounted on the arms of a fly wheel, which revolves in a vertical direction close to the end of the trough, and by that means slices off so much of the tobacco as projects out at the end of the trough, these blades being adjustable by screws.

When the portion of tobacco which projected forward from the end of the trough, has been sliced off by the passing knife, it is necessary to bring another portion forward, to be cut off by the next knife in passing, and so on; the tobacco being progressively advanced upon the bed to meet the revolving knives, which contrivance is called the feeding. This is effected by a follower and longitudinal screw, which acts against the back of the trough, and is kept continually turning, and consequently the tobacco continues to advance toward the knives as long as the machine is in action.

The particular feature in this machine, and in which it differs from the chaff cutters, appears to be the means by which the tobacco is brought forward. This is effected by a small pulley fixed on the end of the fly wheel shaft,

which shaft passes under the bed, and from this pulley a band is carried to a large pulley fixed on the end of the longitudinal feeding screw. Hence it will be perceived, that as the fly wheel, with the cutters, is rapidly driven round the pullies and band, will cause the feeding screw to turn slowly, and to bring the tobacco progressively forward to the knives to be cut.

The speed with which the feeding screw turns, determines the degree of fineness of the ribbons or filaments, into which the tobacco leaves are reduced; and hence a small pulley, placed upon the shaft of the feeding screw, will produce course cut tobacco, while a larger pulley, placed upon that shaft, will cause the tobacco to be cut into fine filaments.

When the whole of the cake of tobacco has been cut, it is necessary to return the follower and screw, ready to receive another cake. This is done by a weight and cord, which is wound up on a small drum connected with the leading screw, during the time it revolves in pushing the tobacco towards the knives. And on the pulley of the leading screw being thrown out of gear, the weight descends, carrying round the screw shaft and drawing back the follower.—[*Inrolled in the Inrolment Office, Feb.* 1823.]

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*To* THOMAS MORGAN, *of the parish of Tipton, in the county of Stafford, Manufacturer of Tin Plate, for a new method of manufacturing or preparing Iron Plates, or Black Plates for tinning.*—[Sealed 9th September, 1829.]

THE object of the Patentee is to dispense with that operation in preparing black iron plates for tinning, called

scaling, instead of which he employs a process called clearing.

The specification describes the iron plates as being made by first passing bars of iron between smooth rollers, for the purpose of flatting out or spreading them thin; and observes, that the bar, before it is operated upon, should be rendered as clean and free from scales as possible; and after being so rolled out, before the metal has cooled, it is to be plunged into water, for the purpose of clearing it of any scales that may have formed in rolling.

After this the flatted bars are to be cut into suitable lengths, and rolled again still thinner, which forms them into plates, taking care that they are not over heated in the thick state, and that a clear blue flame be kept up in the finishing furnace, in order that the plates may be kept free from scales, and as soft or mellow as possible.

SPECIFICATION.

" In cutting the edges of such plates as are intended to be annealed together in a box or case, as hereinafter is mentioned, care should be taken to make them square or true, and of equal size, so that they may be placed evenly in the box, and none of their edges projecting beyond the rest, by which means they can be better annealed than otherwise they could.

" When the black plates have been thus prepared, they must be cleared or pickled in sulphuric acid, or oil of vitriol and water, in the same manner as is now adopted in the scouring room in the last process prior to tinning. Muriatic acid or spirits of salts, and perhaps some other acids might be used in this process, but sulphuric acid is believed the best.

" The object of thus clearing or pickling the plates, is to remove all oxydized and other rough and hard particles from their surfaces; but they do not require to be

so perfectly cleared as in the last process prior to tinning. Scouring is unnecessary in this process, the acid being sufficient to remove all particles from the surface of the plates which would mark or injure them in cold rolling.

" The pickle should be heated, and bran and sawdust may be used therein, as is the usual method of clearing or pickling the plates in the scouring room prior to tinning; and the plates must be kept well separated from each other, and not worked too tight, and occasionally agitated and kept in motion during the process, so that the pickle may pass freely between them.

" The plates will be found more difficult to clear in this process than in that prior to tinning, and will require to be kept longer in the pickle for that purpose; but the length of time cannot be specified, as they must remain till they are tolerably clear.

" About half a box of black plates may be cleared at once in a hole or cistern of ordinary size, that is to say, about twenty-three inches in length by fourteen in breadth; and if the plates have been cold rolled, a greater number may be cleared at once in a hole of the above size.

" To make the pickle of proper strength, about three quarters of a pound, or from that quantity to a pound of sulphuric acid, will generally be found sufficient to a gallon of water; and when a hole of plates has been cleared, about two quarts, or from that quantity, to a gallon of the pickle should be taken out of the hole and replaced by fresh pickle of similar strength for each following hole of plates. The strength of the pickle, however, and the quantity necessary to be changed with each hole of plates cannot be accurately stated, as they will vary with the quality of the plates, the heat of the pickle, and the strength of the sulphuric acid.

"Instead of throwing away such pickle, as is above directed to be taken out of each hole after the plates have been cleared, it will be well to put it into another hole or cistern; and any plates which are difficult to clear, may be pickled twice by putting them fresh into such last-mentioned hole or cistern, (which may be kept up by occasionally adding a little fresh pickle if necessary,) there to remain till they are removed into the hole or cistern in which they are to be cleared as above mentioned.

"As the outside plates are often difficult to clear, it would be better to have them pickled separately from the others, being first enrolled if necessary.

"When the plates have been thus cleared they should be washed and placed on their edges apart from each other to dry. The drying should be effected as quickly as convenient; and for that purpose, the plates should either be dried on a stove, or dipped in hot water previous to placing them on their edges to dry; and if it be intended to anneal them in a box or case, it will be better to use the hot water, and add to it a little quick lime, the more effectually to remove any acid adhering to the plates.

"When the above process (which will prevent the necessity of scaling the plates) is completed, the plates should be cold rolled in the usual way, and afterwards annealed by either of the methods now in use, (that is) either by steeping the plates in diluted muriatic acid and heating them in an open furnace, or by inclosing them in an iron box or case in which they are annealed without the use of muriatic acid. In case of annealing the plates in a box they should be pressed tightly together, so as to admit as little air as possible between them, and the box must be allowed to cool before it is opened.

"Boxes of various constructions have been used for annealing the plates; but those which I have found most convenient have been about an inch and a half longer and broader in the clear than the plates they were intended to anneal, and from four to five inches deep in the clear, with two upright pins on each side of the box, placed about three or four inches from each end, and fastened against the sides, or rivetted through the bottom of the box: the pins may be either round or square, and about half an inch in diameter, and they should stand as far above the top of the box as to reach about an inch and a half above the lid when it is fitted down on the box.

"The lid should be provided with corresponding holes to let the pins pass. Through each pin there should be an opening the long way of the box about the eighth of an inch in width, and an inch in length, and commencing half an inch from the top of the pin, to let in a wedge, which, when driven in, will force down the lid, and keep the plates tight together; for which purpose, as many plates must be put in each box as it can possibly hold consistently with the shutting down of the lid. The lid, sides, and bottom of the box may be about half an inch in thickness, and the sides should be rebated for about half an inch from the top, and the lid made to fit the rebate, so as to be level with the sides of the box when it is on.

"The plates having been annealed are to be pickled or cleared, and scoured in the usual way prior to their being tinned, and it would be well to take out of every hole about a gallon of the pickle after the clearing of such box and plates, and to supply the place with fresh pickle. The pickle so removed, may be used in clearing or pickling the black plates the first time, in the manner hereinbefore directed to be adopted, instead of scaling.

"When the plates have been annealed in a box, it sometimes happens that they do not clear in the scouring room prior to tinning so readily as those which have been annealed in an open furnace. In this case, it may be well to take them out of the pickle when about half cleared, scour them in the usual way, and then return them into the pickle, and complete the process of clearing. They will not afterwards require to be again scoured prior to tinning, washing being in this case sufficient."

The Patentee concludes by saying, "I have detailed the ordinary processes for preparing the plates for tinning, not with a view of claiming them as my invention, but because many manufacturers omit some of the particulars hereinbefore described, whereas it is important that they should all be attended to, in order to obtain the best result from my method of manufacturing. And I claim, as my invention, the adoption of a process as hereinbefore described, of clearing instead of scaling iron or black plates, in the course of preparing them for tinning, and previous to their being cold rolled and annealed, whereby the iron lost in the scaling is saved, and a better article produced at a cheaper rate."—[*Inrolled in the Inrolment Office, March*, 1830.]

## REPORT

### Of the Select Committee of the House of Commons on the Laws of Patents.

(Continued from page 182.)

**Mr. John Farey, called in; and Examined.**

**The greatest length of time for which a patent can be granted is fourteen years, is it not discretionary with the Attorney General to grant it for less if he pleases?—I am not aware of the fact, but I suppose it is.**

Would it be advantageous to the public, that patents might be taken out for a shorter time than fourteen years, supposing that there was a correspondent diminution of expense?—That is the practice in all other countries, but I am scarcely prepared to make up my opinion upon it; it would tend to multiply the number of patents for trivial inventions, which I think is not desirable, because they occasion so much litigation, and that evil would remain, if patent rights were rendered more secure by better law. Shorter terms, at less cost, would be utterly unavailable to patent rights for inventions of importance, which so much require amendment at present; because there the evil is, that fourteen years is too short. In my opinion fourteen years of profitable exercise of an invention is always sufficient, if it has not been preceded by loss that is to be repaid. The question is, whether a part or the whole of that term may not pass away before the profitable exercise begins. An invention which has no such term of unprofitable exercise, might be very well repaid by five years, as in France; but if it is an invention of any importance, there is always a period of positive loss and outlay, and then another period of unproductive exercise, before gain begins. The difference of cost between a five years, and a fourteen years patent, would be of no consequence to patentees of important inventions, where a great outlay of capital is always contemplated. I do not see how the public are ever to get any benefit from it. Patents for profitable objects would always be taken for the longest term, and unprofitable ones become extinct of themselves. It would be only enabling the patentee to save a small sum of money, and inducing a poor man, for the sake of doing that, to forego a part of the advantage he might derive from his invention. My observation supposes the length of the term to be left to the option of the patentee; if the term could be adapted to the nature of the invention, by a discretionary power, very great benefit might arise, if that discretion were wisely applied; but as there is every chance that it would be misapplied, and would then do excessive injustice and injury, I would by no means recommend any such discretion.

Does not it often happen, that after a person has taken out a patent for an invention, he makes some material improvement in the invention which at present requires another patent?—It is a very common case for the same invention to require two, three, and four successive patents; and it is a very great hardship, it operates prejudicially to the public as well as to the inventor. I have known a case where an inventor obtained a patent, and not more than a week after lodging the specification, he made a material improvement upon what was specified; the

improvement is so great, that it would supersede his present article, which is a good one, and sells well; and yet if he practised the last and best edition, his former patent might be brought in question, and therefore he keeps it a secret and does not practise it at all; some time or other he may apply for a new patent, when his old one is expiring, or by his death it may be lost.

In such a case, would not the inventor be in a much better situation, supposing he had taken out a patent for five years, with the power of adding his improvements to the patent, so as to make it then a patent for fourteen years?—If you grant patents for a short period, and allow them to be extended, on paying fees and adding new improvements, there can be but little objection to that; it is the system now in use for the copyright of books, nor do I see any advantage; because reducing the cost in the first instance would come to the same thing, which, as I said before, is objectionable, so long as there is no other check to the excessive multiplication of patent rights, than the cost of obtaining them.

Would not the arrangement proposed in the last question be an advantage in such a case as you have mentioned?—No; because that case merely requires successive specifications to be received, as improvements arise; the last specification, like a man's last will, to be definitive. That is an important arrangement, which is established in France; there, as improvements arise, successive specifications of those improvements can be added (at very little expense) to the original specification, and thus give validity to the patent, even though the first may have been imperfect.

Would not that be very advantageous?—Very advantageous indeed; here there is no remedy for a defective specification at present. When a patentee is compelled to specify his invention within six months, which is the longest period that can be obtained in ordinary cases, if he is not then prepared to specify his invention, with all its details of execution, in a perfect manner, his patent right must take the chance of his imperfect specification; and although he may come to know how to make it perfect the next day, he has no remedy whatever; he has no means of putting upon the roll that additional perfection which he attained in the means of execution, even the next day after specification was enrolled; and if he practises the invention in a better manner than that which he specified, instead of its being held that he is deserving of public approbation, for having pursued his course of invention further than at first, the courts of law assume that he has committed a fraud, by con-

cealing something which he ought to have put into the specification.

Supposing he makes an improvement in the course of two or three years after taking out his patent, what is the effect of that?—The effect is the danger of overturning his patent, if he practises the improvement, or departs from his specification in his practice.

In such a case, would not the ground upon which the patent was overturned be upon the supposition, that at the time of his making the specification he concealed something with which he was acquainted?—Yes; and he can only refute that imputation by proving in evidence, that the specification described does contain sufficient instructions to enable the public to exercise the invention with full advantage. It is impossible for him to prove the negative, that he did not know the improvement at the time of specifying. When a man invents and takes out a patent for a steam engine, steam coach, or a lace machine, or a mule to be worked by power, six months is the utmost he can get for preparing his specification; he uses his utmost exertion to get his engine made, and put to work, before the time when the specification is due, in order to make a trial of it, and regulate his specification by that trial; perhaps just before the time when he is expecting to get it to work, some part fails, or requires to be re-made, which prevents his making any trial, and the time being come, he is not able to try his engine before he must put in his specification, which he therefore makes as well as he and his adviser can guess, without any trial, though he has gone through nearly all the trouble and expense of a trial; then a few days after, having enrolled, he finds out, upon experiment, some most important improvement in the means of carrying his invention into effect, which either had not occurred to him before, or if he had thought of it, he could not have safely put it into the specification, because it was a mere speculative idea. If he had put in that speculative idea, and it had turned out on subsequent trial to be wrong, it would be said in a court of law this is a blind, this is nonsense, to mislead the public from the real invention, which he reserved for his own private practice.

In that case the inconvenience arises from want of time?—Yes; and the expense of those hurried proceedings, to get a sufficient trial of new machines to enable us to specify properly is excessive, being frequently obliged to keep people working night and day. I have sat up all night many times myself, for such work, and have undergone such fatigue, that I could not be any way sure of what I was doing. Even when a successful trial has been accomplished, there remains so little time after-

wards, that the specification must be composed in such haste as to run the greatest risk of some inaccuracy or error.

Supposing a specification to be so accurately drawn as to be sufficient to inform the public how to use the invention at the time that the invention is enrolled, and that subsequently to that, the inventor discovered some improvement in his invention, his patent is not forfeited by his using that improvement? —No, not by law; but he must prove that his original invention would answer the purpose proposed, and be a useful and beneficial practice, and the fact of his departing from it, is presumptive against him; therefore in such a case, when the right comes to be tried in a court of law, the inquiry does not turn upon the real patent machinery that is in actual use, doing business and public good, but it is necessary often to make old-fashioned and obsolete machines that have been described in the specification, but have been superseded by better ones, and are of no use whatever except to satisfy a court of law, that what was specified will really do; and if by such evidence the court can be persuaded they will do, then, however inferior they may be to the more recent editions of the inventions (which they never examine), the patent escapes from being set aside for want of sufficient description. If the opposite parties can persuade the court that the machines described will not answer, then the patent is set aside, without any inquiry into the real merits of the invention in its modern form, and that which is in daily use, and is the subject of the action.

Is it not quite fair that the patentee should be bound to give such a specification?—Unquestionably; when an inventor's patent is set aside because he has not fully described his invention, it ought to be on the ground that the secret has been withheld, so that the public are really not in possession of it, and have consequently not derived the benefit of such possession. Instead of making ridiculous inquiries whether an obsolete specification is so defective as to destroy the patent, it should be amended by a new one, corresponding with the improved state of the practice. On the other hand, if the public are really in possession of the invention, and deriving benefit from its exercise, whether they became possessed by means of the old specification or not, the patent ought not to be set aside. It is law, that if a patent invention is insufficiently described, the patent cannot be maintained: that is, where the specification does not contain such information, that persons conversant with that art can practise the new invention with real advantage, and quite as much advantage as the patentee practised it at the time of recording the specification. That remedy for a bad specification is merely penal, and the public

has no advantage from it whatever; they do not get any more complete specification by annulling the patent. If the patentee were to be compelled to bring a better specification, there would be a real advantage; and if he refused to do so, then the present penalty of forfeiture would be very properly applied.

Do you think that the public would have any security against those imperfect specifications, by the appointment of a commission to examine the specification before it was inrolled?—It would be very easy to have specifications examined and verified either by a competent commission, or by suitable referees. The courts of justice now trust to the examination and opinion of others, but they do it in an improper manner, because it is by parties, brought by interested individuals, and when it is too late to amend any defects. It is quite a branch of my business, where there are any disputes upon patents, to examine and speak to the precision or defects of the specification; where there is any doubt about it, I always have machines made in exact conformity with the drawings, and put them to the actual test. The expense of doing so is very great. A case occurred very recently of a patent invention, for which I made a specification in the year 1816, Clegg's Gas Apparatus, since called Crosley's Meter; it was just such a case as I have been describing, where the men had been working night and day to get machines to work before specifying, and only one out of two could be got to trial, consequently a specification was made describing the untried meter, in such a manner as we thought would be most likely to answer in practice when the experiment was made; but after that experiment was made, it became apparent that some things that we supposed to be the best were not the best, but as we put the whole in, the specification proved sufficient. A trial upon that patent right took place lately, in the Court of King's Bench between twelve and thirteen years after the specification had been made, and then the question was asked, why we put all those things in; in fact, they were put in necessarily, to secure ourselves against this improper hardship of the law, but with no intention of concealment or confusion. That patent was one of the very few that have been established, but it was attacked upon every ground of objection that could be made to a patent.

What should you think of the appointment of a commission authorized to examine specifications, and to certify whether they were sufficient to enable the invention to be used by the public?—I think that a specification ought not to be inrolled at all, till it is made sufficient; and that there should be no further inquiry about the sufficiency of the description, except by

way of appeal against the examiners; one-tenth of the trouble and expense that is now incurred, to find out whether it is sufficient or not, when it is too late to make any remedy, would have made it sure at first.

Do you think a commission would be a proper mode of determining that sufficiency?—I think a commission well constituted would determine that and many other points very well; but I think it would be very objectionable that any previous examination should take place, as to the merit of inventions; because it is impossible to foresee which will, by future cultivation, grow up to maturity, and which will not be worth such cultivation; hence every one should be allowed a fair chance.

Would you think that such a commission should consist of certain fixed members, or that it should be appointed *pro re nata*?—I have not considered that subject enough to make up my mind; but any competent person can say whether a specification is intelligible, or whether it is not; and if it is not sufficient, the inventor should be called upon to make it sufficient; if he proves that having used reasonable diligence he has not had time to do so, more time should be allowed than was at first granted. If he makes improvements afterwards, he should be called upon to inrol them, so as to keep the record of the Patent Office a correct transcript of his operations; that is the practice in France; but there it is left to the option of the patentee; I think it should be compulsory.

How would you propose to remedy the inconveniences you have stated?—I have not formed any specific plan; but knowing the practice of France, having executed many specifications in that country, and seeing how much better their system is, I can speak from experience on the general principles that I have endeavoured to explain, without being prepared at this moment to say how far we ought to modify such a system in introducing it here; our circumstances are so different, that it would require much consideration how it should be regulated.

You complain of the inconvenience of being hurried in bringing the invention to a specification, within the time given for it, how would you propose to remedy that?—By a discretionary extension of the time allowed for specifying; always granting three months, and more than that, when a fair case is made out.

At whose discretion would you place that?—In France, discretionary extensions of time are granted by ministers, at the recommendation of those referees who generally pass the specification, if it is judged expedient to keep them secret.

Upon a representation from the applicant?—I believe so; but the extension is not for the specification; they require a complete specification in the first instance, before granting the

patent in order to be transcribed in the patent itself. They also require the invention to be put in practice within two years; if the patentee fails in doing that, from reasonable causes, they allow him more time if he shows that he has used diligence, and has not succeeded for want of time. The specification is always given in at the first, and is copied into the patent itself, which is a great improvement upon our plan; I think the patent and the specification should always form one deed.

Would you compel the party to specify his invention as soon as he applies for his patent?—To specify the principles of his invention; more than that cannot be done in an efficient manner, until after it is put in practice.

How could the complete specification be inserted in the patent, if in applying for the patent he only gave in the principles of the invention?—He must have some certificate of having lodged the heads of his invention, or the outlines of the specification, that certificate being a sort of promissory note at sight, that he should have a patent given to him, upon his application, at any time within some certain period after date, the patent being given to him upon the condition of his then paying the price, and furnishing such a specification as should be approved, and which should, when made complete and approved, be inserted into the patent itself. Therefore the period which now elapses between his making the application and the inrolment of his specification, which is four or six months, would be the period which he would be allowed to make his experiments, and his specification founded thereupon; and he should have a full security against surreptitious communications of his invention in the meantime. The security against infringements should not be given, until the real patent is granted, with its meaning fully defined in itself; any previous security against infringements would be only nominal, because profitable infringements cannot take place in a new invention in so short a period. Infringements began before the date of the patent should not be inquired into, and the uniform continuance of them afterwards, should be allowed on fair terms, to be settled by arbitration, without giving the patentee any prohibitory power.

It appears that the course of application is, first, a petition to the Secretary of State, then the issue of the patent, and then the inrolling of the specification?—Yes.

The interval between the petition and the issue of the patent is uncertain?—It is; from six weeks to six months; commonly two months at an average.

The time between the issue of the patent and the enrolment of the specification is determined by the patent itself?—It is

from two to eighteen months, as declared in the patent itself; commonly six months.

Then you would propose to secure to the applicant, from the time of his application, his right to the principle of his invention?—Yes, to the invention of which he details the heads; and all such fair developement of those heads as he is prepared to specify completely how to practise them, at the time when his specification is due, or with such extension of that time as is reasonable.

So that before his patent is issued, he should be required to enrol his specification?—Yes, in order that the specification may be transcribed in the patent itself, having been first approved to be sufficient, and if found deficient, or not confined within the limits of the heads first lodged, it should be amended. Whether the specification should be approved by a distinct commission, or by referees, I am not prepared to say; either way would do, if competent persons. The organization of a complete plan would require long consideration, but I feel very confident in the goodness of the principles I have suggested, having frequently considered them, but I have not set about the arrangement of any plan for carrying them into execution, because I have never seen any chance of a new plan being adopted.

By a record of the heads of an invention, could you so secure to the applicant his invention, as to leave him at sufficient liberty to pursue his invention, for the purpose of making a complete specification?—I think he ought to be bound to be able to define his principle very accurately at his first application, because he ought not to be allowed even to apply for a patent, when his invention is a mere vision: he ought not to come until he has done all that can be done mentally, by himself, and by projection on paper, so as to be fully prepared to state all the principles or heads of his invention, leaving nothing remaining to be done but what requires to be decided by experiment.

In the experiments which it would be necessary to make, in order to perfect the specification, would he not run great risk of divulging his invention, although he had entered the principal heads?—I have not sufficiently considered whether those heads should be kept secret or made public. Some public notice of the application should certainly be given; but one object of my proposition is, that if an accidental disclosure of the whole secret did take place, the inventor ought not to suffer any material injury from it. I have been told that in France an applicant may give the heads of the invention in a sealed packet, and obtain security from that date; but I am not aware of the

fact, from my own practice, nor do I find it provided for in the French law.

Will you instance, in the case of Mr. Watt's improvement in the steam engine, the proposals which you suggest for the improvement of the process in obtaining a patent?—I think that the deed which Mr. Watt enrolled for his specification, ought to have been lodged at the time of making the first application for his patent; and he should have been allowed at least two years for making engines and the experiments necessary for specifying the means by which those principles should be carried into execution; within that two years he should have made such a specification as would have really instructed competent workmen how to practise the invention, whereas that knowledge never came before the public from Mr. Watt, till long after his patent was dated, and then only incidentally, not by the operation of the law.

Could Mr. Watt have made that statement of heads of invention, without previous experiments?—Yes, at the time he drew up those heads (which I say are not specific enough to be a specification,) he really had made no engine, and only a private experiment by himself, with a very incomplete model, not a working model.

Would a specification of those heads have secured him against any rivalry?—They did so in fact most completely for thirty years; his paper was most admirably well drawn, and very definite; but in allowing those heads to pass for a complete specification, a latitude was given to Mr. Watt, in favour of his great services, which the courts have never allowed in any other case, because they took it for granted, on very insufficient evidence, that they were sufficient directions to enable other persons to practise the inventions; but they are not so in fact, and upon the grounds on which courts have proceeded in all other cases, they should have annulled that patent, for want of sufficient description in the specification. It was sufficiently full and definite to enable him to maintain his patent; but those who wanted to practise the invention could not do it upon that specification. It told them plain enough what they were forbidden to do, during the term of his patent, but did not explain how they might do it, after the expiration of that term.

Then he gave in for a complete specification, that which, according to your ideas, ought to have been given in in the first instance?—Exactly so; and he never did give any complete specification such as I think ought to have been given in the second instance; the consequences of that omission have been important in his case, for long after the expiration of his patent, which was prolonged and kept in force in the whole for more

than thirty years, engineers who wanted to make steam engines, had to go and steal a knowledge of his invention from his factory, or from examining engines made by him, with as much difficulty as if he had never had a patent. Going to the office and reading the specification did not answer the purpose at all. It was not till twenty years after the expiration of Mr. Watt's patent (which was fifty years after its commencement) that any number of the many manufacturers of steam engines in England, understood how to make them perform with the same perfection that they were made by Mr. Watt himself, within ten or twelve years after his patent, and as he ought to have instructed the public by a specification, as soon as he could have done so.

Can you illustrate by instances from patents that have expired, the two sorts of specification that you recommend?—Yes, I will draw up papers for the Committee for that purpose. The real specification in any invention of importance will of course be very long, and require drawings; but the heads of invention must be very concise but definite.

Was Mr. Watt's right to his patent fully protected by the law during the time he held it?—It was in fact, but I think not according to what the courts have held in other instances; they allowed his specification to be sufficient, when, in other instances they have not allowed more complete specifications to be sufficient; but his case did not pass without many arguments for and against: Mr. Holroyd was his counsel; the courts were occupied with it several times in 1795 and 1796; his law expenses were enormous, and would have been very serious to him, if he had lost the cause.

Do you consider that the term of fourteen years is sufficient in all cases?—By no means; I have stated before that fourteen years profitable exercise of any invention is sufficient; the question is, when that profitable exercise will begin, and how much previous loss and outlay is to be made up; in some instances it begins from the first; in many instances it does not take place at all during the term of fourteen years. In the case of Mr. Woolf's invention of working steam engines by high pressure steam acting expansively (either in one or in two cylinders,) there was no profitable exercise of that invention for at least ten years out of the fourteen, and there was so much loss incurred at the first, that the profit made during the last four years never repaid it.

Will you explain what means it is necessary to resort to, in order to obtain an extension of a patent in this country?—That is only done by a specific Act of Parliament, which is very difficult to obtain, and very expensive to solicit.

Are there many instances in which patents have been extended by that means?—Several; but they have never been extended, unless the inventor had the foresight to get them extended at an early period of the invention, when there was no opposition to them; Mr. Watt would have found it difficult to have obtained his extension at a late period, or without the influence of Mr. Boulton; but at the time when they applied to Parliament Mr. Watt had revealed only the heads of his invention, as they stand in what he called his specification, but the means of execution, although fully made out, remained in his own keeping; it was a strange oversight, that Parliament did not insist upon his making a real specification, when the extension was granted.

Are you aware of any applications for extensions having been refused?—Yes, several; there was one recently withdrawn a few days ago; Crosley's for a gas meter; Bramah's for his locks, was withdrawn in the same way; that was tantamount to a refusal, because the parties would not have withdrawn their bills, if there had been any prospect of success.

Would you wish a discretionary power to be vested in somebody for extending patents?—That would be a very difficult subject; those discretionary powers should be very carefully watched, or they would grow into very gross abuses very soon.

In France, it is lodged in the Chamber of Deputies, is it not?—I believe it is; the only proposition that occurs to me on the moment is, that if a proper and responsible commission should be appointed, their recommendation to Parliament, (founded on due inquiry and on their report, with evidence) might be very much attended to, so as to facilitate the obtaining such Acts of extension.

You would not think it desirable to vest that power in any other hands than those of Parliament?—I think not; if it were vested in the Crown, it would soon grow into the same abuse that existed before the Statute of James the First.

Does not the law, as to the duration of patents, operate very unequally upon different patentees?—Excessively so, almost in the inverse ratio of the merit and importance of the invention. An important invention is only a source of expense and labour to the inventor during several years, till it is brought to bear very completely; and frequently the greater part of the time expires before it is brought to bear at all. It often happens that the profit arising from the first exercise of it, after it is brought to bear, will not repay the loss and expenses which have been occasioned in its first establishment

Can you give any instance of this oppressive operation of the law?—Many; Mr. Woolf's is a striking instance; he carried on business to a loss for at least ten years of his patent, and

though he made profit in the last four years, it did not pay the loss during the first period. The extension since given to that invention is so important, that the existence of deep mining in Cornwall at this moment depends upon it. The difference in cost between the quantity of coals consumed by the engines now in use (which are all on Mr. Woolf's system,) and by an equal force of engines, such as were in use before he went into Cornwall in 1813, would absorb the profit of all the deep mining that is now carried on in Cornwall. I think Mr. Woolf is more entitled to a public reward, for the services he has rendered, without any recompence, than any inventor who has ever been rewarded by Parliament. Mr. Crosley, whose bill is just withdrawn, is another case; and Mr. Eaton, who invented the self-acting mule to put up by power. The establishment, and consequent profitable exercise of many inventions when made complete, is often retarded and prevented by public prejudice, and ignorance of their true value; also by the opposition of work-people, and the fear that they may mutiny in establishments where new inventions are first practised. I could give many instances of such cases; Mr. Eaton's is a strong one; the few machines that he made, when I prepared his specification ten years ago, have continued in profitable use ever since, but no more can be got introduced. Also Mr. Morton, for whom I made a specification in 1818, for a new slip to draw up ships, in order to repair, instead of a dry dock.

Will you state to the Committee what is the mode of proceeding by a patentee when his patent is infringed?—He must wait till he gets unquestionable evidence of the fact of infringement, which is often a very great difficulty. It facilitates the obtaining evidence to apply to the Court of Chancery; but if he has got good evidence he had much better come to a court of common law at once, without going first to Chancery. If he wants to extract the truth from the party infringing, he may possibly learn something by bill and answer.

If he has got evidence of the infringement, would not his first course be to obtain an injunction?—That is generally done to obtain evidence; if he has got evidence of the fact, the best course is to proceed at law.

Is it not an object to obtain an injunction, with a view to have an account kept of the profits?—That is the advice of most lawyers, but I never knew any practical good in it; because I never saw any real damages awarded for by-gone infringements, or those committed before a patent right had been tried and decided by a court.

May not the patentee pursue one of two courses, he may proceed either by a bill of discovery, or he may apply for an

injunction?—Yes; in fact the Chancellor will grant an injunction *ex parte*, leaving it to be maintained, or removed, according to the answer of the defendant. If the answer alleges that the patent is not good, the Chancellor directs an issue at common law to try that fact, and in the meantime either removes the injunction, (leaving the parties to keep an account of the practice they make of the invention while the right is being tried;) or if it is a gross case, he sometimes continues the injunction. After obtaining a verdict that the patent is good, the Chancellor would award the damages; but it is so rare that a patent survives a trial, that I cannot tell you of any cases of satisfying damages being really paid by decree of Chancery. There is one now (the same Mr. Crosley before mentioned) who has got his patent safe through the Court of King's Bench; it is Clegg's patent for gas apparatus, which I have before mentioned, and he expects to get a great deal of damages for bygone infringement; but I doubt very much of his success, upon the ground that the condemned infringers will say it was unknown whether this patent was good or not; and therefore until that was known, they could not tell whether they might infringe it or not; hence I expect nothing but nominal damages will be given.

What is the course of defence usually made by the infringer of a patent?—The usual course (if unquestionable evidence is given of the infringement) is to contend that the patent is bad in law.

Have you known such defences frequently prevail?—They almost always prevail; it is exceedingly difficult to maintain a patent, the grounds upon which a patent may be vitiated are so numerous.

Supposing an incorrect specification has been made, what remedy have the public besides that of using the invention; have they any means of setting the patent aside?—A *scire facias* may be brought against a patentee, calling him into court to show why his patent should not be repealed, upon any ground of objection; but it is a very expensive mode of proceeding, and it puts the parties opposed to the patent in the situation of plaintiffs, which is not often the best for them, and therefore they rarely resort to it. In the other case, several different defendants may attack him in concert, by infringing the patent in every quarter, and making a common purse to carry on the war, that is a much better course for them, because if the patentee succeeds in one action, he must then try another, till his money is all gone, and he can scarcely ever keep his patent right alive to overcome them all. The few patents that have been supported have been commonly sustained by collusion with the in-

fringers themselves, after one trial has decided that the patent is not absolutely bad, they combine with the patentee to allow them free use of the patent on moderate terms, and then, by making a common purse, they prosecute and suppress all new infringements: to effect that, they must keep up the appearance of law proceedings, but defend themselves so as to let the patentee get a verdict, which is only sham; but added to the common purse, it serves to terrify new infringers, who are not allowed to have licences or practice at all, whereby the patent right becomes a close monopoly, instead of a general practice paying a small rent to the patentee. If patent rights were made more secure in law, and by less expensive proceedings, it would not suit the interests of patentees to enter into such combinations, but, on the contrary, to promote the most extensive and open use of their inventions, under licences, at a moderate tax.

When an incorrect specification is made, the remedy of the public, is to use the invention and leave the patentee to his remedy at law?—Yes, and the remedy is the same when the patent is bad on any other ground.

Is not the remedy of getting a bad patent set aside by *scire facias*, a very expensive one?—It is.

Do you consider a more easy mode of setting aside defective patents should be adopted?—I think they need nothing more than to let them die a natural death, which they do without any process at all. There is a long process laid down in some old law books, by which the patentee may be called upon to surrender and bring his invalid patent into court, to have it cancelled, and to have the great seal torn from it; but all that is quite useless, and is never practised.

Do you think it would be right to allow patents to be supported for inventions which have become obsolete?—At present if an invention has ever been known or in use in that part of the kingdom to which the patent extends, previous to the date of the patent, slight proof of that fact will set aside the patent; the efficient revival of neglected and obsolete inventions I think ought to be encouraged as if they were new, but that would require regulation.

Can you set aside a patent on the ground that the inventor has not put his invention in practice, during the continuance of the patent?—That is the law in France, within two years, but in this country it is only inquired into by the Judges as a measure of the merit and utility of the invention; collaterally it operates, but not directly; they assume that if an invention does not come into use, there is something wrong in it, and call upon the parties to show why it is not in use. The law requires that the invention shall be publicly beneficial, and if it is not

exercised, that is *prima facie* evidence that it is not publicly beneficial, and the parties are called upon to show the reasons why it was not exercised.

Is it not the law with regard to patents, that you cannot take advantage of the invention of a principle without describing how that principle is to be exercised?—It is. The patent contains a provision, that no other person shall counterfeit, imitate or resemble the invention; that is construed in the courts to mean, that they shall not take the same principle, and use other means of carrying it into effect. But if the new means used by infringers are so superior, as to supersede the original altogether, then they are commonly allowed to be used, on the ground that they must necessarily be new inventions, and not the patent one, which from its non-success, must be defective.

So that if in a specification you describe one mode of carrying the principle into practice, that patent would not cover other modes, by which the same principle might be carried into effect?—It would, if those other modes do not produce any superior effect to the original mode; but if they are so very superior, as to supersede the original, they could not be stopped by the patent. That is the manner in which I have found the courts to proceed; but it may be easily imagined, in such matters the courts will be continually deceived in the facts; and as there is no declaratory law, all inferences from precedents of this nature are very deceptive, because we cannot know upon what facts (real or assumed) the court founded their decisions.

Does not this prohibition to take out a patent for a principle, lead to a great multiplication of counts in the specification of a patent?—It does; and it is a great trouble and difficulty in preparing a specification, because it is necessary to foresee all the varieties of modes of execution that may be given to the invention, or principle, which is the essence of the patent right. It is necessary, for the security of the inventor, to describe them all, to preclude other people using them, and that the inventor may have his choice of that way which future experience will decide to be the best.

Is not there another reason for multiplying those counts, namely, to blind the public, and not to let them know upon which of the practical methods it is, that the inventor really means to depend?—I think that is rarely the intention of inventors, because when they make their specifications, they cannot know which is the best, for want of experience. They are always accused of that intention in courts, and called upon to show the contrary, but it can very rarely be so, when the specification is prepared by a professional man, who can have no

motive of concealment, and who would lose his reputation if the description proved deficient; if he is deceived by a cunning inventor, he must be a very incompetent person. In Arkwright's case, it was proved in evidence that he had deluded or overruled the person he employed to draw his specification.

Would not the allowing the patent to cover the principle, provided there were one good method described of carrying the principle into effect, lead to a more precise and clear specification?—Decidedly it would; but if the patent were given for the principle exclusively, it would be pernicious to the public, that other inventors should not be permitted to work upon that principle by other methods of execution, so as to produce a better result.

You think that for a limited period, between the taking out the patent and the inrolling the specification, the right ought to cover the principle of the invention?—Unquestionably during that period, the inventor should have an entire right to all those principles of which the heads are detailed in the first paper that is lodged, and all possible applications of them, in order that the inventor may have his choice, which application he will pursue in practice, in order to specify them. Having specified, his right by patent must be contracted to what he has so specified, but leaving him full liberty to add supplements, and thereby keep his right always enlarged up to the fullest extent that he can maintain, by continuing his labours.

Supposing a man falls upon the discovery of an entirely new principle of science, such as the condensation of steam, and its application to mechanism, how would you propose to secure the advantage to the discoverer of that principle without precluding the attempt at improvement by other persons?—I do not conceive that patents are or ought to be merely a recompense to the inventor for the merit he has displayed, in what he has done previous to the grant being made; it is a sort of bargain, or a lease granted of some small portion of the public employment that is new, and has not hitherto been cultivated; that if the lessee will go to work to bring the new invention to bear, he shall have the benefit of working it for some certain time, which it is supposed will leave him a fair term, after it is brought into profitable exercise; but if the time, when properly employed, does not allow that fair term of profitable exercise, then some extension or recompense should be allowed, to cover the deficiency.

Supposing a person had discovered the principle of the condensation of steam, as applicable to first movers, and had merely given, as the mode of carrying that into effect, the form of the atmospheric engine; do you think that his patent ought to have precluded Mr. Watt, during the continuance of four-

teen years, from applying for a patent for his steam-engine?—Certainly not; but at the same time it is very unjust to an inventor, that because he is superseded by some successor, he should lose all benefit from his patent; they ought to be allowed to go on together, and the profit ought to be fairly divided between them according to their previous labours, and expenses not yet recompensed, and the share each one has had in obtaining the improved result; neither ought to be stopped, the public ought to be served in all cases, and a recompense ought to be found for all those that have served the public. Such cases are not likely to occur frequently in great inventions, unless very long patent rights were estabiished; a term even of twenty years is barely sufficient to establish one such invention, much more to see it superseded by another.

Supposing a person has discovered a principle, without inventing any method of carrying it into effect, and subsequently some method of using that principle is invented by another person; do you conceive that the person who has invented the method, should make some compensation to the person that has discovered the principle?—I think that he who has invented the method should be made to divide the advantage fairly with him who had before discovered the principle, because both parties have contributed to the public benefit; they are in the relative situation of a landholder, and the farmer who cultivates his estate,—both should participate.

How could you arrange the compensation?—It could only be arranged by arbitration.

In France, are not secret patents taken out?—In France, the specifications are always kept secret, during the term of the patent, and even afterwards, when the government decide that it is adviseable to do so. The specification has sometimes been kept secret in this country, by express Act of Parliament.

Do you know any instance of a secret patent being granted in England?—Some specifications have been kept secret by specific Acts of Parliament. In the interval between granting the patent and inrolling the specification, application is made to Parliament to suspend the operation of that clause in the patent, whereby the specification is to be inrolled in the court of Chancery, and to order that the said specification shall not be made public; Commissioners are appointed by the Act to take charge of the secret specification, to examine its sufficiency, and to answer all legal questions concerning it, without disclosing the secret.

Do you know upon what grounds the specification is kept secret?—It is commonly upon the ground that the invention shall not get away to foreigners.

What is your opinion of the policy of such a provision?—I think it is always improper, that there should be any thing like a secret specification, under any circumstances whatever.

May it not operate unjustly against individuals, who without knowing any thing of it, may be expending large sums of money in endeavouring to carry the same thing into effect? Decidedly so; and as a means of keeping our inventions from foreigners, it is the highest premium that can be offered to an inventor, to go or send it abroad himself, because he will have no competition in the foreign country, and can obtain a patent there; it also offers a high premium to all the workmen to go abroad, who first get a knowledge of the invention (and who in that character, are for a time very important to both nations which shall get their services, whereas if foreigners can get intelligibly written specification from the offices, for a small sum of money, they prefer setting their own men to work on such instructions, to the expense of taking our workmen away; or they do not begin at first, to seduce our workmen; and after a time when they do begin, we have got several instructed, so that the loss of a few is not felt. I know practically, the evils which have been experienced from useful workmen being enticed abroad, in order, by their means, to steal secret inventions, of which they possessed an exclusive knowledge: the best remedy for it, was to take out a patent in France, and I was sent there to solicit the patent, and thus prevent their exercising the invention there, after they had stolen it. That French patent has one of the most complete specifications I ever made; it is in the French language, and is now deposited in Paris; but no specification of the same invention exists in England, or in English. After that French patent was so obtained, a very considerable manufactory was established under it there by Englishmen; but the origin of the measure was to prevent seduction of workmen, which would never have happened, (or at a later period when it would have been of no consequence,) if foreigners could have got a specification freely from our patent offices, they would have set their own men to work on it by preference.

Does not the claim of originality, with respect to a single minor point which is not original, vitiate the whole patent?—It does.

Do you not think that that is very impolitic?—It is a most excessive hardship and injustice, and every way impolitic; the reason for it is, that so long as patents are granted merely upon the request of the inventors, and whilst they are left at liberty to specify what they please, if there were not some limiting penalty of that sort, they would put inventions *ad infinitum* into

their specifications, for the chance, that if one hook did not catch, another might.

Do not you think that the proper course would be to set aside that part which is not original?—Decidedly, that is justice; and yet it should not be allowed to the inventors to put an unlimited number of inventions into their specifications; but the practice of leaving them to their own discretion, under the penalty of setting aside their whole patent, because they have exceeded just bounds (which bounds are not defined) is both unjust and impolitic.

(*To be continued.*)

## Novel Invention.

*Braithwaite and Ericsson Fire extinguishing Steam-Engine.*

THERE are occasionally projects in mechanical science which, though founded upon correct principles, appear at first sight impracticable, because at variance with some preconceived notions which we have long entertained. Under this description of inventions may be ranked the fire extinguishing engine of Messrs. Braithwaite and Ericsson. For the very idea of lighting a furnace, and getting up the steam to high pressure for working an engine on the first discovery of an accidental conflagation, seems to involve such an expense of time and labour as to induce a conviction of its absurdity from the reasonable probability that the flames would have destroyed a considerable mass of property before the means of extinguishing them could be brought into action, yet such is the ingenious construction of this engine, and the facilities which it afford, of being quickly brought into operation on any emergency, that we really consider it an important acquisition to our previously existing means of protection, and feel persuaded that a dispassionate considerations of its capabilities and powers will obtain for it that extensive public approval which it unquestionably merits.

Plate IX. is a longitudinal elevation of the engine, which is one of high pressure, intended to exert the power of six horses. It consists of two cylinders placed horizontally, the one being the steam cylinder of seven inches in diameter; the other, the water pump, of six and a half inches in diameter, with a stroke of sixteen inches. The steam and water pistons are connected by being affixed to one rod, and consequently receive a simultaneous action, by the rod working through stuffing boxes at the end of each cylinder; which rod, by its horizontal action, forms its own parallel motion, the stuffing boxes serving as guides.

The principal feature of novelty in this engine, and the one by which its extraordinary powers have been so successfully developed is the boiler, for which Messrs. Braithwaite and Ericsson have obtained a patent, (see vol. iv. p. 188, Second Series of our Journal) which is constructed on the same principle as the boiler of the "Novelty" Locomotive Engine, exhibited on the Liverpool and Manchester Railway in the autumn of last year. By the use of this boiler a very rapid generation of steam is obtained—a considerable saving in the expense and consumption to fuel is effected; and the weight and size of the carriage much less than could have been made by any other construction of boiler. An apparatus is attached, for the purpose of forcing the heated air through the flues of the furnace, and for creating a very rapid and effectual combustion. The other parts of the machine consist of the necessary water and mercurial guages for safety, and for the regulation of the operative parts of the engine; force pump for supplying the boiler with water, safety valves, &c. &c.

Having now described generally the mechanical ar-

rangement of the engine, we proceed to detail more minutely its various operative parts; *a*, is a frame of wood mounted on springs, to which are attached the running wheels, (which are made of iron on Mr. Theodore Jones's patent principle) this frame supports an inner one of iron, carrying the cylinders and the principal working parts of the engine. At one end of the frame will be seen the steam chamber *b*, on the top of which is the safety valve *c*, and a box or hopper *d*, for supplying the furnace *e*, with fuel: from the upper part of the furnace flues are carried in a horizontal direction, occupying the inner part of the boiler *f*, through which flues the heated air is forced at a very rapid rate, and after imparting its caloric to the water in the boiler, escapes through the bent pipe or chimney *g*.

Steam is admitted into the cylinder *h*, by turning the cock in the pipe *i*, through the passage *j*, the slide in which is actuated by a cross head fixed on the piston rod *k*, giving motion to a lever *l*, which lever also works the force pump *m*, and blowing apparatus concealed in the boot of the diving box *n*. On the axle of the hinder wheel, which is an excentric *o*, which, as the engine is proceeding to a fire, gives motion to a lever connnected with the blowing apparatus by which steam is generated previous to the engine being put in operation: this apparatus can be worked by hand if necessary, and be detached in an instant from the operative parts of the engine; *p*, is a double action water-pump, the bucket of which is attached to one end of the piston rod *k*; there are two suction pipes, one of which is seen at *q*, through which the water passes to the pump, where it is forced into the air vessel *r*, through the passages *s*, and discharged through the nozzle *t*, to which the hose and fire and pipe is attached. This engine has only two nozzles, but any

number proportionate to the power of the engine may be provided, thereby doing the work of a corresponding number of engines on the ordinary construction; *u*, is a pipe for carrying off the waste steam from the cylinder *h*, and *v*, is the box for containing the fuel, &c. which also serves as a seat for the assistant engineer attending the furnace; *w*, is the mercurial gauge, &c. We next proceed to describe the operation of the engine, which is as follows:—On the alarm of a fire being given, while the horses are being attached, the engineer supplies the boiler with the necessary quantity of water by the force pump *m*, which, as will be seen, is provided with a hand lever for the purpose; this done, he feeds the furnace through the hopper *d*, and should the horses not be ready, proceeds to work the air forcing apparatus, with the lever beforementioned; immediately on the engine starting, the excentric and its lever works this apparatus, and most probably before the engine arrives at its destination, the steam is got up to the pressure necessary to put it in full operation, for that object is generally accomplished in the space of eighteen minutes, the management of the engine being so very simple, any person at all acquainted with the nature of a steam engine will at once perceive that it requires but one engineer to attend to the steam cocks, &c. and an assistant to give his attention to the furnace, force pump, &c.: in fact, on one or two late occasions it has been successfully worked by one hand only.

The effect produced by this engine has been fully demonstrated by various experiments which have been made with it, and is as follows:—through a branch pipe, with an opening of seven eighths of an inch in diameter, 9,000 gallons of water (about forty tons) were delivered per hour to an elevation of ninety feet: through two jets, with an opening of three fourths of an inch in diameter,

fifty tons per hour were thrown to an elevation of fifty or sixty feet; and, on a calm day, with a seven-eighth's aperture, the water has been thrown as high even as 140 feet, which is sufficient to reach the top of the highest buildings; but might be much further extended by the use of an engine of greater power than the present.

Before closing our notice of this ingenious piece of mechanism, we cannot help offering a few remarks on the utility of such an engine, not only as regards the metropolis, but also the principal commercial and manufacturing towns throughout the kingdom, where much valuable property is frequently destroyed, as well from the inadequacy of the supply of the water, as from the insufficiency of the power applied to engines constructed on the ordinary principle: this has been particularly evident, where the fire has originated at the top of a high building, such as the warehouses of our docks, and the immense factories of Manchester, Leeds, &c. At the same time, we think that the inventors are deserving of the public patronage for the ingenuity which has been displayed in the arrangement of the various parts of the apparatus, and for the spirited manner with which they have come forward on many late occasions to give their voluntary assistance in endeavouring to save the lives and property of their fellow-creatures. We understand that the Dock Company of Liverpool, aware of the inability of the present engines to extinguish fires at the upper or even middle part of their high warehouses, and with a laudable zeal for the encouragement of British ingenuity and industry, have given the inventors an order for one of a much greater power, viz. fifteen horses, which will throw up at an immense height, a quantity of water almost incredible, and we hope that the other leading towns of this kingdom will not be long in following their example.

## New Patents Sealed, 1830.

To Matthew Bush, of Dalnonarch Print Field, near Bonhill by Dunbarton, North Britain, calico printer, for his having invented certain improvements in machinery, or apparatus for printing calicoes and other fabrics.—Sealed 24th May, 6 months.

To John Holmes Bass, of Hatton Garden, in the county of Middlesex, Gentleman, for his having invented certain improvements in machinery for cutting corks and bungs.—3d June, 6 months.

To John Levers, of New Radford Works, near the town of Nottingham, in the county of Nottingham, lace machine maker, for his having invented or found out certain improvements in machinery for making lace, commonly called bobbin net.—8th June, 6 months.

To George Vaughan Palmer, of the parish of Saint Peter, in the city of Worcester, artist, for his having invented a machine to cut and excavate earth.—8th June, 6 months.

To William Tutin Haycraft, of the Circus, Greenwich, doctor of medicine, for his having invented or found out certain improvements in steam engines.—11th June, 6 months.

To Thomas Brunton, of the Commercial Road, Limehouse, in the county of Middlesex, merchant, and Thomas John Fuller, of the same place, civil engineer, for their having found out and invented an improved mechanical power, applicable to machinery of different descriptions.—19th June, 6 months.

## CELESTIAL PHENOMENA, FOR JULY, 1830.

| D. | H. | M. | S. | |
|---|---|---|---|---|
| 1 | 0 | 0 | 0 | ☉ in Ephelio. |
| 1 | 0 | 0 | 0 | Clock before the ☉ 3 *m* 21 Sec. |
| 1 | 14 | 0 | 0 | ☽ in conj. with γ in Libra. |
| 2 | 16 | 0 | 0 | ☽ in conj. with φ in Oph. |
| 4 | 12 | 0 | 0 | ☿ in conj. with ζ in Taurus |
| 5 | 0 | 0 | 0 | Clock before the ☉ 4 *m* 5 Sec. |
| 5 | 14 | 24 | 0 | Ecliptic opposition or ○ full moon. |
| 5 | 19 | 0 | 0 | ☾ in conj. with ν in Sagett |
| 7 | 23 | 0 | 0 | ♃ in conj. with *o* in Sagett |
| 8 | 4 | 0 | 0 | ☿ in conj. with ξ in Taurus. |
| 9 | 18 | 0 | 0 | ☾ in conj. with λ in Aquarius. |
| 10 | 0 | 0 | 0 | Clock before the ☉ 4 *m* 53 Sec. |
| 10 | 4 | 0 | 0 | ☾ in conj. with φ in Aquarius. |
| 12 | 15 | 36 | 0 | ☾ in □ or last quarter. |
| 13 | 11 | 0 | 0 | ☿ in conj. with η in Gemini |
| 14 | 1 | 0 | 0 | ☾ in conj. with 2 in Ceti. |
| 14 | 19 | 0 | 0 | ☿ in conj. with 1 μ in Gemini |
| 14 | 20 | 0 | 0 | ☾ in conj. with f in Taurus. |
| 15 | 0 | 0 | 0 | Clock before the ☉ 5 *m* 31 Sec. |
| 15 | 6 | 0 | 0 | ♀ in conj. with ι in Taurus |
| 15 | 17 | 0 | 0 | ☾ in conj. with γ in Taurus |
| 15 | 18 | 0 | 0 | ☾ in conj. with 1 δ in Taurus |
| 15 | 18 | 0 | 0 | ☾ in conj. with 2 δ in Taurus |
| 15 | 23 | 0 | 0 | ☾ in conj. with α in Taurus |
| 15 | 20 | 31 | 0 | ☾ in conj. with α in Leo. An occultation, Immersion 20 h. 50 m. Emersion 16 d. 0 h. 37 m. |
| 19 | 12 | 14 | 0 | Ecliptic conjunction or new moon. |
| 20 | 0 | 0 | 0 | Clock before the ☉ 5 *m* 57 Sec. |
| 22 | 7 | 0 | 0 | ♀ in conj. with ζ in Taurus |
| 22 | 9 | 0 | 0 | ☽ in conj. with ε in Leo. |
| 22 | 17 | 0 | 0 | ☿ in conj. with δ in Gemini |
| 22 | 22 | 38 | 0 | ☉ enters Leo. |
| 24 | 1 | 0 | 0 | ☽ in conj. with β in Virgo. |
| 24 | 16 | 0 | 0 | ☽ in conj. with π in Virgo. |
| 25 | 0 | 0 | 0 | Clock before the ☉ 6 *m* 9 Sec. |
| 25 | 4 | 0 | 0 | ☽ in conj. with 1 γ in Virgo |
| 27 | 4 | 0 | 0 | in conj. with π in Virgo |
| 27 | 8 | 36 | 0 | ☽ in □ first quarter. |
| 27 | 12 | 0 | 0 | ♃ in conj. with 1 ν in Sagett |
| 28 | 22 | 0 | 0 | ☽ in conj. with γ in Libra |
| 29 | 9 | 0 | 0 | ☽ in conj with ψ in Libra |
| 29 | 14 | 0 | 0 | ☿ in conj. with π in Gemini |
| 30 | 0 | 0 | 0 | Clock before the ☉ 6 *m* 6 Sec. |
| 30 | 1 | 0 | 0 | ☽ in conj. with φ in Oph. |
| 31 | 4 | 0 | 0 | ♀ in conj. with μ in Gemini |

The waxing moon ☽.—the waning moon ☾

Rotherhithe. J LEWTHWAITE.

## METEOROLOGICAL JOURNAL, FOR MAY AND JUNE, 1830.

| 1830. | Therm | | Barometer. | | Rain in inches |
|---|---|---|---|---|---|
| | Hig. | Low | High. | Low. | |
| MAY | | | | | |
| 26 | 59 | 47 | 29,42 | Stat. | ,375 |
| 27 | 58 | 45 | 29,56 | 29,46 | ,15 |
| 28 | 58 | 45 | 29,96 | 29,75 | |
| 29 | 63 | 40 | 30,02 | 29,94 | |
| 30 | 58 | 41 | 29,76 | 29,72 | ,3 |
| 31 | 65 | 41 | 29,91 | 29,80 | ,4 |
| JUNE | | | | | |
| 1 | 66 | 50 | 29,98 | 29,96 | ,05 |
| 2 | 69 | 39 | 30,06 | 30,00 | |
| 3 | 64 | 46 | 29,79 | 29,56 | |
| 4 | 58 | 47 | 29,83 | 29,49 | ,9 |
| 5 | 65 | 41 | 29,95 | 29,92 | |
| 6 | 67 | 44 | 29,93 | Stat. | |
| 7 | 61 | 49 | 29,86 | 29,84 | ,025 |
| 8 | 60 | 46 | 29,96 | 29,94 | ,175 |
| 9 | 57 | 46 | 29,99 | Stat. | ,025 |
| 10 | 56 | 46 | 29,95 | Stat. | ,025 |

| 1830. | Thermo. | | Barometer. | | Rain in inches. |
|---|---|---|---|---|---|
| | Hig. | Low | Hig. | Low. | |
| 11 | 65 | 45 | 29,93 | 29,90 | |
| 12 | 65 | 44 | 29,72 | Stat. | ,125 |
| 13 | 58 | 40 | 29,76 | 29,72 | |
| 14 | 60 | 40 | 29,66 | 29,56 | ,05 |
| 15 | 57 | 43 | 29,69 | 29,56 | ,575 |
| 16 | 60 | 45 | 29,79 | 29,56 | ,15 |
| 17 | 55 | 43 | 29,86 | 29,83 | ,075 |
| 18 | 66 | 41 | 29,74 | 29,60 | |
| 19 | 61 | 43 | 29,60 | 29,58 | ,125 |
| 20 | 64 | 43 | 29,58 | 29,55 | ,05 |
| 21 | 66 | 41 | 29,52 | 29,45 | |
| 22 | 58 | 44 | 29,60 | 29,39 | ,15 |
| 23 | 62 | 36 | 29,82 | 29,76 | |
| 24 | 68 | 45 | 29,85 | 29,83 | |
| 25 | 70 | 52 | 29,74 | 29,63 | ,25 |

THE

# London

## JOURNAL OF ARTS AND SCIENCES

AND

## REPERTORY

OF

## PATENT INVENTIONS.

*CONJOINED SERIES.*

No. XXIX.

## Recent Patents.

*To* ISAAC DODDS, *of Horsley Iron-works, in the parish of Tipton, in the county of Stafford, engineer, for an improved combination of materials and method of manufacturing valves for steam engines or steam apparatus, or for any other fluid or gas, or in any other situation wherein valves or sluices may be used.* [Sealed 14th September, 1833.]

THE Patentee states, in his specification of the above patent, that these improved combination of materials, and method of constructing or manufacturing valves for steam engines or steam apparatus, or for any other fluid or gas, or in any other situation wherein valves or sluices may be used, is applicable to the kind of valves

commonly called sliding valves, in which the moving valve is formed with a truly flat or even surface to apply in exceedingly close contact with a corresponding immoveable flat surface within the box or chamber, wherein the sliding valve is contained; and which last-mentioned flat surface has an aperture or apertures in it or through it for the purpose of the steam, gas, or other fluid which the sliding valve is intended either to intercept or to allow to pass, as may be required; and which intercepting the sliding valve, performs by covering up and closing such aperture or apertures, when the valve is slided along the flat surface into a suitable position against the same, in which case the passage of the fluid through the aperture or apertures will be stopped; but the sliding valve being slided along the flat surface into another suitable position, the sliding valve will then uncover and open the apertures in the immoveable surface so as to permit the passage of the fluid through the same apertures, for the passages of fluid are sometimes made in the flat surface of the sliding valve as well as in the immoveable flat surface; and such passages are variously arranged and combined to suit particular purposes, and produce the opening of one passage simultaneously with the closing of another passage, or the opening of two passages at once simultaneously with the closing of two other passages, according to many varieties of combination of materials which are well known and in common use in steam engines; but in all cases the perfect operation of such sliding valves depends upon the close contact of the flat surface of the sliding valve to the immoveable flat surface, so that no steam, gas, or other fluid, can escape or pass between the surfaces when the apertures are closed.

In some kinds of sliding valves hemp packing is applied behind or at the back of the valve to fit closely thereto with as much compression as will retain the flat surfaces in close contact; in other cases springs have been used to retain the flat surfaces in contact. But this improved combination of materials, and method of manufacturing such sliding valves, is to apply certain wedge-like filling pieces of metal behind or against the backs or other parts of the sliding valves, in order, by such filling pieces, to make out the valves to the proper thickness for filling up the boxes or chambers wherein the sliding valves are contained. The filling pieces may be made to move or slide with the valves like one piece therewith; but by suitable adjustment of the position of the wedge-like filling pieces behind at the back or other parts of the sliding valve, the flat surfaces of the latter can be kept in close contact with the immoveable flat surfaces against which they are intended to slide.

These wedge-like filling pieces which are applied at the backs of the sliding valves, must be accurately fitted thereto; and the wedge-like surfaces of the filling pieces may be applied to the backs or other parts of the sliding valves, which must in that case have a corresponding wedge-like form at the back or other part; and when so applied, the flat surfaces of the filling pieces must be exactly parallel with the front surfaces of the sliding valves: these flat surfaces of the filling pieces applying to the flat inside surfaces of the boxes or chambers wherein the sliding valves are contained, at the same time and in the same manner as the front flat surfaces of the sliding valves apply to their corresponding immoveable surfaces, in or through which the apertures are made for passages; and the last men-

tioned surfaces must be exactly parallel with the inside surfaces of the boxes or chambers, against which surfaces the back of the wedge-like filling pieces behind the valves apply: wherefore a sliding valve, and its wedge-like filling piece, when put together as aforesaid according to this improved combination, will fill up the interior of the valve box or chamber; but, nevertheless, by adjusting the position of the wedge-like filling piece in respect to the sliding valve, the combination of materials can always be made to fill the interior as the materials of the sliding surfaces diminish by wearing away, or otherwise such wedge-like filling piece may be applied within a valve box or chamber behind (or at the back or other part of) a sliding valve, whereof the flat surfaces of the back and front are exactly parallel to each other: in which case the wedge-like form is not given to the sliding valve itself, but the same will be at the back of the filling piece, and the inside of the box or chamber must also be wedge-like in exact correspondence therewith (instead of the wedge-like form being at the back of the sliding valve, and at that surface of the filling piece which is in contact therewith); and also in such case the wedge-like filling piece will not slide or move with the sliding valve, but will remain stationary at the back thereof, and will only be moved when required for the purpose of adjusting its position, in order to make the valve fit as its sliding surfaces wear away.

And for the more complete explanation of this improved combination of materials, and method of manufacturing valves for steam, or for any other fluid or gas, the several figures in Plate III. represent sections of valves for steam engines, constructed according to these improved combination of materials.

Figs. 1 and 2, are vertical and horizontal sections of a sliding box valve, the different parts of which are shown detached in fig. 7: *a, a,* is the flat face of the sliding valve, which applies in close contact with the flat surface of the metal casting A, A, of the nozle or side pipe of the engine cylinder F, and in which surface the apertures are made for the steam passages, the flat surfaces of the valve and nozle being accurately fitted together so as to slide one against the other, without permitting any leakage or escape of steam between them: *b, b,* is the back of the valve, being inclined in a wedge-like form; and V, is the wedge-like filling piece, which is applied behind the valve with its inclined surface *d, d,* in accurate contact with the corresponding surface of the sliding valve; and the flat back *e, e,* of the filling piece also fits accurately in contact with the inside surface of the chamber B, B, in which the valve is contained, that surface being parallel to the flat surface A, A, of the nozle in which the apertures are formed; D, is the rod by which the valve is slided or moved within the chamber or box: it passes through a stuffing box in the cover E, of the valve box, and is attached at the upper end to a cross rod K, see the detached fig. 7, by means of which motion is given in the usual manner to the rod D; and the lower end of that rod within the box is formed into a screw, on which a square nut *k,* is fitted; and notches are formed in two of the opposite sides of that nut to receive the prongs of a fork *l,* which is affixed to the wedge-like filling piece V, by which means the fork is so connected with the nut *k,* that the piece V, will be moved up and down within the box by the motion of the rod D. The valve is caused to move in a similar manner at the same time by means of a square hoop *h,* which encompasses the

valve. The end of the rod D, passes through the upper side of this hoop, and is secured by a collar fastened on the end of the rod D, so that it is securely connected with the hoop in order to cause the latter to move up and down in its box; but, nevertheless, the rod D, is left at liberty to be turned round; and in like manner the upper end of the rod D, is attached to the cross rod K, so as to permit it to be turned round when required in order to adjust the position of the wedge-like filling piece V, in respect to the sliding valve, for by turning the rod D, round, the square nut *k*, is caused to move downwards towards the sliding valve, and by the fork *l*, of the filling piece the same is also moved downwards in respect to the valve, and thereby bears the same towards its flat surface so as to insure perfect contact therewith. The horizontal section or plan, fig. 2, shows the relative positions of the valve, and of the filling piece behind it.

It will be perceived that the valve and its filling piece are not so wide as to fill the box laterally, but they leave a space at the side for an entrance-passage to the steam coming from the boiler, in order that it may enter freely both above and below the valve. Fig. 3, shows another instance of the same improved combination and method of manufacturing a sliding box valve, in which the wedge-like filling piece V, does not slide, or move with the sliding valve, it being lodged in the valve chamber behind the valve, and its inclined or wedge-like surface being applied in contact with a corresponding surface withinside of the chamber; and the surface of the filling piece V, which is in contact with the back of the valve, being exactly parallel to the surface in which the apertures are formed, and against which the face of the sliding

valve is in contact, therefore the back and front surfaces of the valve are exactly parallel to each other. D, is the rod by which the valve is moved, it passes through a stuffing-box in the cover of the valve-box.

The filling piece V, may be forced down by screws also passing through the stuffing-boxes in the cover, or it may descend by its own weight, which, will, in many cases, be sufficient to cause it to urge the valve towards its flat surface, so as to make close contact therewith. The operation of either of these sliding valves, is to open one pair of passages and close another pair simultaneously, as is usual in common slide valves; and that operation may be varied in any other usual mode, without affecting the nature of this invention, which is the wedge filling piece, and its combination with the sliding valve by the means already described, so as to admit of adjusting its position.

Fig. 4, represents another variety of these improved combination of materials applied to the manufacturing of double sliding valves for steam engines, (viz.) where one sliding valve is applied at one end of the steam cylinder, and another at the other end. A, A, is the flat surface of the nozle or side pipe of the cylinder F, as in the former figure. *b*, *b*, the backs of the sliding valves, each being inclined to the face of the same valve in a wedge-like form; and V, V, two wedge-like filling pieces which are applied behind each of the valves, to move or slide therewith, and fill up to the flat insides of the valve chambers, which latter are parallel to the flat faces of the nozle, against which the corresponding faces of the sliding valves act. The application of each wedge-like filling piece

is much the same as hereinbefore described in reference to fig. 1, but when two valves are combined, their wedge-like filling pieces V, V, may be reversed to each other; and the two reversed filling pieces being connected together by a rod M, they are both kept in their proper places, so as to retain both the sliding valves in proper contact with their flat faces respectively. In the middle part of the rod M, a joint is made with a double-screwed socket, having right and left handed screws on the two parts of the rod M, in order that by turning the socket round, the two filling pieces V, V, can be forced further apart from each other, so as to press the two sliding valves towards their faces by one action, which can be done from time to time as the surfaces wear away. N, is a door to open and give access to the joint *m* of the rod M, when the valves require to be tightened; and the rod M, may be connected with its wedge-like filling pieces V, V, by means of springs, which are so interposed as to permit of slight yielding. The two valves are moved or slided both together by their rod Q, which connects them, and by the rod R, which passes through a stuffing-box to the outside in the usual manner of double sliding valves.

Fig. 5, is another example of the application of these improved combination of materials to double sliding valves. The wedge-like filling pieces V, V, are applied in a similar manner to that hereinbefore described in reference to fig. 3, not being intended to slide or move with the valves; but they are lodged in suitable wedge-like recesses of the chambers behind the valves, with their wedge-like faces behind, and in contact with the corresponding surfaces of the chambers. The two opposite surfaces of the valves

are exactly parallel to each other. The wedge-like filling pieces V, V, may each adjust themselves by their own weight, or by distinct setting screws for each filling piece, as before explained respecting fig. 3, or in order to secure such a correspondence of action in the two wedge-like filling pieces as will cause both valves to be tightened alike by them. The two wedge-like filling pieces V, V, may be connected by means of rods X, Y, proceeding from each one respectively through stuffing-boxes in the covers of their respective chambers; and the said rods, X, and Y, being harnessed to the two opposite ends of a lever T, the two wedge-like pieces V, V, will act mutually to tighten the contact of the two sliding valves both at once, and equally one with the other: the adjustment for such tightening being given by lengthening the rod Y, by means of a screw socket *m*, with right and left hand screws on the two portions of the rod, as before explained as regards fig. 4, and springs may be applied to the rod Y, to admit of a little yielding; and as to the particular angle of obliquity of the wedge-like filling pieces, the same may be as represented in the figures, or, in case the said filling pieces are intended to act by their own weight, as before mentioned respecting fig. 3, or by the agency of springs as before mentioned respecting figures 4 and 5, without positive confinement by any screws. Then the Patentee states that he prefers the obliquity of the wedge-like pieces to be an angle of forty-five degrees, because with that angle the said wedge-like pieces V, V, can retreat sufficiently to allow the valves to separate a little from the faces, against which they apply in case of great violence of action on the valves, when water is accidentally collected in the steam

cylinder, although they will steadily retain the valves in their places in fair work and ordinary action.

The said sliding wedge pieces may be made of cast iron, or of brass, or of bell metal; the sliding valves, and the chambers in which they are contained, being made of the materials usually employed for such purpose.

Fig. 6, is another example of the application of these improved combination of materials to double sliding valves, the wedge-like filling pieces V, V, are applied in a very similar manner to that before described in reference to fig. 5, not being intended to slide or move with the valves, but they are lodged in suitable wedge-like recesses of the chambers behind the valves, with their wedge-like faces behind, and in contact with the corresponding surfaces of the chambers. The only difference between fig. 5, and fig. 6, is the form of the wedge-like filling pieces V, V, and the top of the chamber; the upper side of the wedge-like filling pieces V, V, are at right angles with the face of the valves: also, the upper side of the chamber is parallel with the upper side of the wedge-like filling pieces V, V, and at right angles with the face of the cylinder.

The Patentee states, in conclusion, that having now described the nature of my said invention, I do hereby declare, that the improved combination of materials, and method of constructing or manufacturing valves, consists in the application of wedge-like filling pieces at the back of or behind the valves, or otherwise within the chambers wherein such valves are contained, in the manner hereinbefore set forth: such application being for the purpose of tightening such valves, and ensuring a correct contact between their fitting surfaces, when the materials of which

those surfaces are composed wear away; and that, in the construction or manufacturing of such valves, glass, earthenware, or any other material, may be used or employed when the valve or valves are applied for the conveyance of corrosive fluids or gases.—[*Inrolled at the Petty Bag Office, March*, 1834.]

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*To* JOHN PAUL NEUMANN, *of Cornhill, in the City of London, merchant, for certain improvements in making or producing leather from hides and other skins, being a communication from a foreigner residing abroad.*—[Sealed December 21st, 1833.]

THE novelty of this invention consists in employing the hop-plant, whether root, stalks, or leaves, or any part thereof, to be used by itself for the purpose of tanning, or in conjunction with any vegetable substance or material containing tanning matter. The Patentee states, that the mode which he chiefly prefers using this plant for the purpose of tanning, is to grind or reduce it to as fine a powder as practicable; and when so prepared, it may be employed for every mode of tanning in the same manner as bark, or any other vegetable tanning material, according to circumstances to suit different hides or skins. This tanning matter may be applied either warm or cold, whether in extract or mixed with other matter: the practical tanner will soon perceive the mode which is most applicable for the different hides or skins which he means to subject to the process of tanning for different hides and skins require different modes of treatment. With some, it is necessary to use heat or warmth, and others should be tanned cold; but he prefers having the

hides or skins prepared in the usual mode hitherto followed by practical tanners.

The principal novelty in this invention consists, as before stated, in using the hop-plant for tanning, which has never before been employed for that purpose, and by means of this process, it will be rendered more extensively useful and valuable.—[*Inrolled June 20th*, 1834.]

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*To* JAMES WINDEYER LEWTY, *of Lichfield-street, Birmingham, in the county of Warwick, brass-founder, for his invention of certain improvements in castors.* —[Sealed 5th October, 1833.]

THE improvement in the construction of castors specified under this patent, is exhibited in Plate III. fig. 7, is an external representation of a castor constructed with these improvements; fig. 8, is a section of the same, in which the external arrangement is more clearly seen: *a*, is the ordinary socket or part to be attached to the furniture; *b*, a cylinder, which descends from the socket *a*, and is attached to it by brazing, or otherwise. By means of this cylinder *b*, the weight and strain on the castor is more securely supported, the castor being at the same time capable of turning with ease. The cylinder *b*, projects into and turns within the socket *c*, formed in the horn or lower part of the castor; these parts all being accurately fitted into each other: *d*, is a pin or axis passing through the horn or lower part *c*, of the castor, through the cylinder *b*, the end *g*, being rivetted within the socket *a*, as shown in the figure: *h*, is a washer or ring of metal

between the bottom of the socket *a*, and the rivetted head *g*, of the pin: *e*, is an enlargement of the pin *d*, fitting into an opening formed at the bottom of the socket *c*; and *f*, is a projecting head formed on the lower part of the pin.

Having described the manner of constructing these improved castors, the Patentee states in conclusion, that he wishes it to be understood that he lays no claim to those parts of castors that are already known and in use; but claims as his invention the application of the cylinder *b*, to the socket (or part to be attached to the furniture), *a*, having a pin or axis *d*, *e*, *f*, *g*, passing through it to turn on, and at the same time to retain the parts together as shown, by which he states that castors will be greatly improved in strength and durability.—[*Inrolled April*, 1834.]

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*To* PIERRE ANTOINE ANGILBERT, *of Upper Charles street, Northampton-square, in the county of Middlesex, gentleman, for his invention of certain improvements in preserving animal and vegetable substances.* [Sealed 1st June, 1833.]

THE improvements described in the specification of this patent, are applicable to the preservation of animal and vegetable substances in metal or earthenware vessels, the mouths of which are closed by certain methods not hitherto practised in closing vessels used for such purposes, by which methods the Patentee states he is enabled to make a better and more complete air-tight joint between the vessels and their covers;

yet the two parts can afterwards be separated readily, and without using violence, whereby the contents of the said vessels may be taken out without injury to either the vessels or the contents. By these means the same vessels may be used many times over, whereas, by the methods at present practised of closing such vessels, violence is requisite to open them, by which the vessels themselves and their contents are generally injured. These improvements consist, therefore, first, in closing the apertures of metal cases or boxes which are used for preserving meat and vegetables therein, prepared by processes well known and in use; and, secondly, in closing the apertures of earthenware jars or vessels which are used to preserve fruit and vegetable substances, the acids of which act upon metals.

Fig. 9, Plate III, is a vertical section of a metallic vessel adapted to be enclosed according to this improved method, for preserving provisions. Fig. 10, is a plan of the same, the cover being removed. It is a cylindrical case *a*, *a*, made of sheet iron tinned, or it might be made with any other metal that will not communicate any unpleasant or prejudicial quality to the provisions preserved in it; but tinned iron is the most convenient material. The upper edge, instead of being plain, for the lid to be soldered on to it in the usual way, is made with a projecting hollow rim *b*, *b*, forming a channel round it, into which the edge of the cap or cover *c*, is to fit its edge *d*, *d*, being turned downwards for that purpose, as shown in the figures. The channel *b*, *b*, is intended to contain metallic solder; and while the solder is in a fluid state, the cover is put on and pressed down into its place so as to bury its lower edge in the solder, which being afterwards allowed to cool, and set around the lower edge of the cover, it adheres

to the bottom and the sides of the channel *b*, *b*, thereby binding them together and forming a sound joint.

The operation of enclosing provisions in these improved cases is as follows:—The case being first filled with meat, vegetables, or other provisions, prepared in the usual way, an annular plate of iron *e*, about an inch and a half or two inches broad, is put round the case about an inch below the rim, as shown in fig. 9. The plate *e*, is cut across, and its ends being brought together so that the plate clasps tightly round the case; the ends are fastened together by staples driven tight over them, so that they overlap each other. The annular plate *e*, *e*, will therefore do for boxes or cases of various diameters.

The case being now ready, melted solder is poured into the channel *b*, and hot coals put on the plate *e*, around the case, which will keep the solder in a state of fusion while the lid *b*, is being put on and pressed down, as aforesaid, into its place, its lower edge being plunged below the surface of the melted solder.

Should any part of the edge not be well covered with solder, the defects must be remedied with a little powdered rosin and solder. When the joints are well covered with solder, the hot coals are removed from the plate *e*, *e*, and the solder is allowed to cool and harden, whereby a sound joint is made. The annular plate *e*, *e*, may then be removed; and the iron box being now closed with an air-tight joint, may be exposed to the heat of boiling water to expel the air and gases therefrom. This operation is assisted by a small hole, which is left in the cover to allow the escape of a little air from the box when the cover is put on, without which it might be difficult to fit the cover on correctly, and also to allow the air and gases evolved from the pro-

visions during the boiling thereof to escape; and as soon as the operation is finished, that hole must be stopped up with solder. To open the case and remove the cover *c*, in order to take out the preserved provisions from one of these improved air-tight metallic cases, the annular plate *e*, *e*, is to be again put round it, and hot coals placed thereon, and kept burning until their heat melts the solder or fusible metal contained in the channel *b*, *b*; the cover *c*, can then be easily lifted off without injuring the case.

The solder, or fusible metal, may be left afterwards to cool in the channel *b*, *b*, where it will remain ready to be heated again the next time the box is filled and closed. The solder to be used may be common solder, composed of a mixture of tin and lead; but the Patentee finds it more convenient to use a solder, fusible at a lower temperature, made of a mixture of tin, lead, and bismuth, which may be rendered fusible at a less degree of heat than common solder. The proportions between the component parts of the solder used, will be, of course, varied according to the temperature at which it is desired that it should be fusible. The Patentee has found that a solder fusible at two hundred and forty-six degrees of Fahrenheit's thermometer, and composed of four parts of tin, one of lead, and five of bismuth, answers the purpose very well. The Patentee states, that part of the improvements which relates to closing the apertures of earthenware jars or vessels, so as to exclude the external air from them, in order to preserve fruits, or any other kind of vegetable substances usually preserved in such earthenware vessels, consists in a method of closing the apertures thereof, by means of caoutchouc or Indian rubber; which material not being acted upon by the heat, and being

perfectly impervious to the air, is well fitted to be used for the purpose. In order to apply the caoutchouc, the earthenware jars or vessels are made with a flat rim, projecting out all round the edge of the mouth: upon which rim a ring of caoutchouc is laid, being cut out to fit upon the rim, or a circular piece of Indian rubber, covering the mouth of the jar as well as the rim, may be used. Over the Indian rubber is a cover made of earthenware, or plated metal, which has a flat rim projecting round it to fit upon the flat rim of the jar; the cover is forced tight down upon the packing of Indian rubber interposed between the two rims by means of staples or spring holdfasts, which clasp the two rims between their prongs: several of these staples being driven tight over them, and round their circumference, force them into contact with each other. The Indian rubber packing being thus compressed between them, excludes the air, and forms a sound joint. The fruit or other vegetable substance contained in the jar is to be boiled after the jar is closed.

It will be necessary to leave a small hole in the cover, and then a metal cover should be used, and the hole stopped up afterwards with solder. And to prevent damage to the earthenware, by hammering on the staples that force the rims together, a ring or washer of Indian rubber should be put under the rim of the earthenware jar, and another on the upper side of the rim of the cover, if formed of earthenware, to prevent the metal staples from being in contact with it.

The Patentee states in conclusion, "that the methods herein described for making a close and air-tight joint enclosing the apertures of metal or earthenware vessels, constitute his improvements in preserving animal and vegetable substances, and are, to the best

of his knowledge, new, as applied to excluding the external air from vessels of metal or earthenware for the purpose of preserving animal and vegetable substances therein, and therefore claims the exclusive right to the same under his patent."—[*Inrolled November 13th*, 1833.]

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*To* RILEY CARR, *of Sheffield, in the county of York, manufacturer, for his invention of certain improvements in machinery, for cutting, cropping, and dressing woollen and cotton cloths.*—[Sealed December 11th, 1833.]

THESE improvements in machinery for cropping the pile or nap of woollen cloth, consists of an improved construction of the spiral blades, or rotatory cutters of shearing machines, used in cutting, cropping, and dressing the pile of woollen and cotton cloths; and consist in turning up the two edges of a plate of metal (of a suitable length and breadth for the blades), thereby forming two cutting blades, standing at an angle to the base, or part of the metal plate, which is affixed on to the roller or cylinder of the shearing machine. See the sectional fig. 11, Plate III. By these means the spiral blades will be held more firmly, truly, and securely, on the cylinder or roller, than can be obtained with single spiral blades, fastened to the cylinder in the usual mode of constructing rotatory cutters.

Fig. 12 is a representation of a part of two spiral blades or cutters, detached from the cylinder of a shearing machine. Fig. 13, is a representation of the same adapted to the cylinder, ready to be applied to the

frame. It will be seen by fig. 12, that the whole is formed from one plate of metal.

The Patentee remarks, that he has not thought it necessary to show a shearing machine in his specification, as that machine is well understood; this invention relating only to the spiral blades, consequently it is only necessary to describe the manner of constructing them; the manner of working or using them being similar to single rotatory spiral blades or cutters: *a, a,* is that part of the plate which winds round and is in contact with the cylinder or roller *b;* and *c, c,* are the two edges which are turned up, and form the double spiral blade. It will be evident that by constructing two blades in the manner here shown from one plate of metal, the part of the plate between the blades acts as a stay, and materially tends to strengthen the bearing of the two blades on the roller or cylinder of the shearing machine. In constructing these double spiral blades, the Patentee procures a plate of rolled steel, or of rolled iron and steel welded together, the iron being in the centre, of the thickness usually employed for spiral blades; and by forging, rolling, or otherwise turning up the two edges, to form the two blades *c, c,* the plate so turned up at its edges is mounted on a mandrel or cylinder of ten or twelve inches diameter; and after this it is removed from the rollers and drawn out, or elongated in a winding or spiral direction, either of a right or left twist, in like manner to that pursued in forming single blades, by which means the desired spiral figure is given to the double blades: they are then hardened, by heating red hot in a furnace, and immersed in oil or water, and are afterwards ground and set in like manner to single spiral blades. These double blades are then made fast to the cylinder or

roller of the shearing machine, by screws and nuts *d*, attached to the ends in the usual manner of single blades.

The Patentee states, in conclusion, that having described the nature of his invention, and the manner of performing the same, he would have it understood that he does not confine himself to using a plate composed wholly of rolled steel, though he prefers that metal; but it is evident that iron or other metal may have steel edges welded or brazed thereto, and thus produce double blades from one plate.—[*Inrolled June*, 1834.]

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*To* Barthelemy Richard Comte de Predaval, *of Leicester-place, Leicester-square, in the county of Middlesex, engineer, for his invention of an engine for producing motive power, applicable to various purposes.*—[Sealed November 19th, 1833.]

The invention specified under this patent, is an attempt to obtain a rotatory motion from a hollow drum, or cylinder mounted on an axle, turning in bearings in an outer air and water-tight case; the space between the case and the drum being divided by an air and water-tight partition into two compartments of unequal dimensions; the smaller compartment is filled with water, and a vacuum is produced in the larger, when it is expected that the tendency of the part of the drum which is in the water-chamber has to rise by its buoyancy, and the inclination the other part, or that in the vacuum, has to fall by its gravity, will produce a rotatory motion, as long as the vacuum is kept up in one chamber and the water is in the other.

Fig. 1, Plate V, is a side view of an engine constructed on the principal of this invention. Fig. 2, is a similar view, with part of the outer cover being removed to expose its internal construction : *a, a,* is an outer circular case supported on stands ; *b,* is a hollow air and water-tight drum, or cylinder, corresponding in shape with the case *a,* and turning on an axis *c,* working in a stuffing box. This axis is connected to the cylinder or drum, and passes through the case at each side, by which it is supported. The external surface of the drum should be perfectly smooth : *d,* is the edge of a square frame, called the division-frame, shown separately at fig. 3. This frame contains pistons, or packing-plates, filling up the space between the inner drum and the case, on all sides pressing close upon the inner drum in the manner of the packing of pistons. These packings divide the space between the outer case and inner drum into two parts. The friction-plates are shown in a position behind the axis of the drum ; whence it follows, that one part of the space divided is smaller than the other, the larger parts being formed at the parts of the cover shown detached. When these parts are put together, they are secured by flanges and screws, the joint being made air-tight. The smaller portion of the space between the outer case and the drum is filled with water by means of the pipe *e.* It may here be stated, that the proportions of the engine ought to be so calculated, as that the weight of water in the case may be in the proportion of two and a half to that part of the cylinder or drum which is to be surrounded by the water. The pipe *e,* is kept in its place by a bracket or arm, projecting from the side of the outer case ; it is also furnished with a stop-cock at each end. At the top of the pipe is a flat reservoir *f,* above which,

one of the stop-cocks is placed. This reservoir should be equal in extent of surface to that on the plan of projection exhibited by the water in the outer case: *g*, is a cock to allow the air to escape when the water is entering the smaller portion of the space between the case and drum; and *h*, is another air-cock, to which an air-pump is to be attached, in order to cause a vacuum in the larger part of the space between the case and the drum; *i*, is a mercurial gauge, to ascertain when the vacuum is sufficiently perfect.

The Patentee states, that the operation and results of an engine so constructed are as follows: "That part of the hollow drum which is in the water will have a constant tendency to rise, or be buoyed up by the water, while the other part of the drum which is in vacuo will have as constant a tendency to fall; or, in other words, that part of the drum which is in vacuo will always be heavier than that which is in the water, and the consequence will be, that the drum will be constantly turning upon its axis so long as the vacuum is kept up in the larger part of the machine, and water is in the other; and it is scarcely necessary to add, that the axis in that case may be made to turn any working shaft.

Fig. 3, is a separate view of the hollow frame before alluded to, which carries the four pistons, one enclosed in each side and end of it. The pistons are acted upon, or pressed towards the drum, by springs acting, as here shown, between the bridges *k*, *k*. The metallic pistons should have leather packing between them and the drum.

The Patentee states, in conclusion, that his engine may be made of iron, copper, or any suitable metal, and its particular form may be varied to suit particular

localities; and that he claims as his invention the engine or machine as hereinbefore described, acting by a joint power derived from the buoyancy of a body in fluids, and the weight of a body in vacuo.—[*Inrolled May*, 1834.]

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*To* ROBERT HENDRICK GODDARD, *of Woolwich, in the county of Kent, gentleman, for his invention of certain improvements in the construction of weighing machines; and in the mode, manner, or method of ascertaining, registering, and indicating the number of operations or quantity of work performed by weighing, measuring, or remitting apparatus or machines.* —[Sealed 27th February, 1834.]

THIS invention of certain improvements in the construction of weighing machines, and in the mode, manner, or method of ascertaining, registering, and indicating the number of operations or quantity of work performed by weighing, measuring, or numbering apparatus or machines, is designed to prevent fraud in the weighing, measuring, or numbering of various descriptions of articles, and is intended to effect two distinct objects: the first being that of constructing weighing machines, which shall be incapable of discharging the contents of the weighing scale when any improper quantity of goods is contained therein, or so that the contents of the scale cannot be removed in the proper manner, when too much or too little of the articles is contained in it; the second object being that of correctly ascertaining, registering, and indicating the number of operations or quantity of work performed by

weighing, measuring, or numbering apparatus or machines, by means of an apparatus or piece of mechanism connected to such machines or apparatus, which shall be put into operation by the movements of them, when in the act of weighing, numbering, or discharging the contents of the scale, thereby dispensing with the attendance of a person to take an account of such operations; and I would remark, that my improvements are particularly applicable to the weighing of coals, salt, &c., in the discharge of vessels in port. The Patentee has therefore shown in the drawings, accompanying his specification, these improvements adapted to the scales now used in the discharge of coals in the port of London, although it will be evident that the same are applicable to the weighing of various other articles.

The weighing shoots or scales now in use are of two kinds; of an angular or wedge-like form: one of which is hung by axles in an iron bale or stirrup, suspended from one end of a scale beam. On the scale containing the proper quantity of coal, it is relieved by lifting a latch, when (by the peculiar shape) its gravity immediately causes it to fall over and discharge the coal, and to recover its position and fasten itself again. The other description of shoot is of a similar figure, and is fixed to the bale or stirrup, discharging its contents through a door in front, which is liberated and again fastened by a latch. Each of these scales when at work requires the exclusive attendance of a person called a "weigher," whose business it is to regulate the weight, to tally each operation, and to give an account of the same. The objects of this invention, as before described, is to perform with unerring precision and accuracy all the duties of the "weigher."

In Plate IV., fig. 1, is a side view of one of the first mentioned description of weighing shoots or scales, with the mechanism designed to effect the first object of this invention adapted thereto, the scale being empty, or not containing the proper weight of coals. Fig. 2, is a similar view, drawn on a smaller scale, when liberated, and in the act of turning over to discharge its contents. Fig. 3, is another representation when the scale contains beyond the proper weight, and is locked by the preventer, so that it cannot be turned over until the superfluous quantity of coals is removed. Fig. 4, is a representation of the bale detached. A, is the scale, suspended by axles turning in collars in the bale B; *a*, is a latch turning on a pin fixed in the bale with a mortice on its under side to receive the end of the spring bolt *b*, fixed on the side of the shoot, and shown detached at fig. 5. By these means the shoot is locked to the bale, and prevented turning over until released by the mechanism hereinafter described. C, is a rod suspended from a fixed spar or beam, and passing through bearings on the side of the bale. This rod carries the mechanism which releases the scale, and that which prevents its being turned over when any improper quantity of coals is contained in it. D, is a weighted lever, shown detached at fig. 6, turning on an axle on the rod C, having the studs *c*, upon it for releasing the latch when the scale contains the proper quantity. This lever carries another stud *d*, which in conjunction with the preventer *e*, when brought down by the rod C, prevents the latch being released at the time the scale contains more than a proper quantity, see fig. 3. E, is a box, fastened on to the rod C, and containing a spring *f*, coiled round a tube *g*, within it: this tube is supported by a collar on its

upper end pressing on the spring *f*; the other end of this tube is formed into a collar *h*, upon which the loop *i*, (fixed on to the bale,) rests when too much weight is contained in the scale; *j*, is an outer case, or cover fastened to the rod C, to enclose the whole. All these parts are best shown in the several detached views of this spring apparatus in figs. 7, 8, and 9, which are external and sectional representations of the same. The outer case being removed, the operation is as follows: when the scale is empty, or its contents under the required quantity, the weights on the other end of the scale beam, will raise the scale and bale into the position shown in figs. 1 and 7, that is with the tail *k*, of the latch *a*, against the side of the outer case *j*, and the ring *i*, near to the top of the case E, but as the scale is filling, the scale, bale, and latch descend until the tail *k*, has passed the end of the case *j*; the projecting arm *l*, of the latch will now be introduced between the studs *c*, and *o*; *m*, is an interceptor, projecting from the bale, against which the stud *n*, slides, until the bale and scale has descended the proper distance, or until the latch *a*, and the lever *d*, are in a line with each other, see figs. 2 and 3. At this time the proper quantity of coal will be contained in the scale. The lever D, will now be at liberty, and by depressing the handle F, the longer end of the lever D, will be raised, which will cause the stud *c*, to act against the arm *l*, of the latch, and raise it as shown in fig. 2, thereby releasing the scale, which will fall over and discharge its contents; the handle is then let go, when the weight on the end of the lever D, will bring it into its former position.

Should a superfluous quantity of coal be put into the scale, the collar *i*, resting on that of the tube E, will

cause it to descend, compressing the spring *f*: by this movement the interceptor *e*, on the collar *h*, will be brought down into the position shown at the figs. 3 and 9, that is, projecting behind the stud *e*, thereby locking the lever D, and prevent its being moved; but on the superfluous quantity being removed from the scale, the spring *f*, will raise it to its proper position, and release the lever. The stud *o*, is for the purpose of preventing the latch being released by any other means than by the lever D. There is a screw lock *p*, on the bale, by which the staple *q*, of the handle is to be fastened when the apparatus is not in use. Instead of the rod C, being suspended by chains, as shown in the drawing, it may be continued up to the fixed spar or beam, and its lower end connected to the deck of the vessel: this will prevent its being raised, so as to make fraudulent discharges of the scale.

Having described one arrangement of the mechanism designed to effect the first object of this invention, the Patentee proceeds to describe the means of effecting the second object, in connexion therewith; to this description of shoot or scale, a further explanation of this first object will be given hereafter.

The apparatus or mechanism designed to effect the second object of this invention is contained in a case or box, securely fastened from interference when at work, and is connected to one of the axles of the shoot or scale, the movements of which (as the scale turns over to discharge its contents) puts the indicating and registering apparatus into motion, by means of a spring tooth connected to it, the movements of the scale being indicated and recorded by the apparatus. In fig. 10, G, shows this apparatus connected to the shoot or scale ready for operation, and securely fastened to the bale

B, by a staple and lock. Fig. 11, is the apparatus detached, drawn upon a larger scale, with the door or lid of the box open to expose the interior. Fig. 12, is a similar view; the dial plates being removed to expose the toothed wheels and pinions. Fig. 13, is a vertical section, taken through the same when complete, and the door closed.

There is an aperture formed in the back of the case, to admit the square end of the axle of the scale or shoot, which projects through the collar on the bale, and is introduced into a corresponding aperture in the axle *a*, turning in bearings in the case; on this axle is a spring tongue or pall *b*. On the shoot turning over to discharge, the tongue *b*, by its connexion with the axle, moves with it, and in its progress of describing the segment of a circle comes in contact with a tooth of the eight-ratchet wheel *c*, and moves it round the eighth part of its circumference, tallying one weight or operation, the tongue returning to its former position with the shoot A. The spring joint of the tongue giving way, and allowing its end to pass over the back of the next ratchet, the wheel *c*, is prevented from returning by a pall *d*, acting against teeth on its axle. On the axis of the wheel *c*, is a pinion *e*, with eight teeth that works in a wheel *f*, of fifty-six teeth, having on its axis a pinion *g*, with seven teeth, working in a wheel *h*, of 112 teeth. Below this wheel is a circular plate *i*, which has four studs on it, fixed at equal distances, and acted upon by a tooth projecting from the outer edge of the dial plate *k*, of the wheel *h*. The edges of all these wheels and pinions turn in bearings in the frame-work or case.

The action of this apparatus is as follows:—On the axle of the shoot A, giving motion as above described to the wheels and pinions, each draft is indicated on

the dial *l*, of the ratchet wheel *c*, which talleys eight drafts or one ton; in the mean time the pinion *g*, of the wheel *f*, acting upon the teeth of the wheel *h*, causes it to revolve, and indices one ton on the dial plate *k*. When one revolution of wheel *h*, has been completed, 112 tons will appear to have passed the scale, by the indice over the dial *k*. On this dial approaching to a revolution, the tongue or pin fixed on it comes in contact with one of the studs of the plate *i*, and gradually moves it until the figures 112 on its dial *m*, appear opposite the aperture in the door of the apparatus, when the pin on the dial ceases to act upon the studs until the next revolution.

The wheel *f*, is also used for the purpose of effecting an oral indication, when seven tons has passed the scale. This is effected by its turning a wheel *n*, round, which wheel winds up a spring alarum *o*. The teeth of the wheel *n*, projects over only one-half of the breadth of the wheel *f*, and on this half a part of the cogs are removed, as shown at *p*, fig. 13.

As soon as the wheel *f*, has performed one revolution, an escapement is effected by the discontinuity of the several teeth on the half breadth, forming a gap sufficiently large for the winding wheel *n*, to run down: *q*, is a hammer acting upon the bell of the alarum.

For the convenience of ascertaining the quantity of work done each day, or that delivered to different barges during the working of a vessel, the toothed wheel *r*, consisting of forty-two teeth (or any other number may be substituted if divisible by seven) takes into the teeth of the wheel *h*; *s*, is a dial plate fixed on the axle of *r*, and figured from 0 to 42, which figures are seen through the apertures of a moveable plate *t*, in the door. The dial *s*, progresses with the wheel *h*, and at

the beginning of each day's work, or at the commencement of loading a barge, the aperture is to be turned to the 0 on the dial; and on any required number appearing at the aperture, the work is completed, and it is again set at 0 for the next barge or day's work. In the upper part of the case, and contiguous to the axle *a*, is fixed a small recording apparatus *u*, for the purpose of correcting any error in the principal one, should such an event occur; it consists of an eight ratchet wheel 1, acted upon by a spring tongue on the axle *a*; on the spindle of 1 is a pinion 3, of eight teeth, working a wheel 4, of fifty-six teeth; on its spindle is a pinion 5, of seven teeth, working a wheel 6, of forty-nine teeth, which has a pinion 7, of ten teeth, on its spindle, working another wheel 8, of forty-nine teeth. A pall and ratchet catch is attached to the ratchet 1. These wheels are covered by a plate exhibiting three dials, with hands, as shown in fig. 11, indicating the progress of the work.

Figs. 14, 15, and 16, are similar representations of an apparatus, to produce the same results by a somewhat different motion to that described under figs. 11, 12, and 13; the same letters of reference being used to denote corresponding parts as in those figures. The collar *a*, tongue *b*, and ratchet wheel *c*, are the same as in the former apparatus. On the wheel *c*, is a tongue or tappet *e*, which gives motion at each revolution to the next wheel *f*, by acting on one of the seven studs placed at equal distances round its circumference. On the wheel *f*, is a tongue *g*, acting in a similar manner upon the studs of the next wheel *h*, in succession; thereby giving a result at each revolution of the dial plate *k*, of 196 tons. If a greater quantity or number of operations are required to be recorded, a circular

plate as *i*, (in fig. 12) may be added, with a given number of studs thereon to be actuated (by the dial *k*,) as before described. By this arrangement each stud, when moved, causes an indice; the change being made quickly, instead of gradually, as in the former apparatus.

Figs. 17, 18, and 19, are representations of a method of preventing fraudulent indices being made when the registering apparatus is attached to the weighing shoot, by turning it over whilst empty, or when not containing near the proper quantity, and is effected by the following means:—Upon the bale B, is fixed the box *p*, (see the detached partial figures of the bale and shoot, 20, 21, and 22). This box has a strong spring *q*, in it (see the detached fig. 23), resting on its bottom; *r*, is a rod passed through the bottom of the box and spring, with a collar *s*, near its upper end, pressing upon the top of the spring *q*. The lower end of this rod has the loop or bearing *t*, for the axle of the weighing shoot to turn in (see the detached fig. 24); and also a square nut *u*, which fits into and slides in the slot in the bale B; *v*, is the square part of the axle of the shoot, and fits into the aperture in the first axle *a*, of the registering apparatus, which, in this instance, is placed in a slot or mortice *w*, in the frame-work and case (as shown in the partial figs. 25 and 26); by these means the shoot is suspended by the spring *q*, and when empty, or only partially loaded, its axis, by the connexion with the first axle of the registering apparatus, raises that axle and its spring tongue up out of the sphere of operation upon the first ratchet wheel, as shown in fig. 25; therefore no indice can be recorded, but upon the shoot receiving the proper quantity. The spring *q*, allows the bale, axles, and spring tongue to

descend to the bottom of the slot *w*, in the case, thereby placing it in a situation to act upon the first ratchet wheel of the apparatus, as before described.

This contrivance renders a variation in the arrangement of the latch and preventors necessary, although the same parts are used. The same letters are, therefore, used to denote corresponding parts in these figures, as in figs. 1, 2, and 3. The latch *a*, is inverted, and the spring bolt *b*, descends into contact with it; for when the shoot is elevated, the latch and bolt cannot co-operate (see fig. 17): the shoot is, therefore, confined in its proper position by another stud *y*, upon the inside of the bale B (see figs. 17 and 21); *z*, is a spring bolt fixed upon the shoot, which allows it to recover its position when returning, but restrains it from oversetting, until the descent brings the bolt *b*, within the province of the latch *v*, as in fig. 18; when the spring bolt *z*, will have ceased contact with the stud *y*, on the bale B, and leaves the latch *a*, to the before described action. A variation of the position of the interceptor *e*, is also necessary; which is placed on the contrary side of the rod *c*, and protected from being injured, through the stud *d*, by the projecting piece *, on the bale. It will be perceived that the studs *c*, *o*, must be placed above, instead of below, the lever D.

Figs. 27 and 28, show the indicating and registering apparatus G, adapted to the second weighing shoot or scale mentioned at the beginning of this specification. A, is the weighing shoot; B, the bale. Near the bottom of the inclined plane, forming the back of the shoot, is mounted a board or a grating of iron *a*, with pins or axles *b*, *b*, on each side, working in collars on the sides of the shoot.—See the several detached figs. 29.

The board or grating *d*, has a counterpoise weight *c*,

which may be assisted, if necessary, by a spring, in order that it may be retained in its required position. When the shoot is full of coals, the board or grating *d*, presses against the door; and on its being opened, the discharge of the contents force the board *d*, down into the inclined plane (see fig. 29), the coals passing over it; when it recovers its position by the counterpoise, and the door is closed by an attendant. The square end of the axle *b*, of the board *d*, is inserted in the first axle of the registering apparatus, whereby the same motion or action is obtained, and with the same results as when the apparatus is attached to the axles of the other weighing shoots. For applying the apparatus to this description of shoot, the order of the wheels and mechanism is inverted, as shown in fig. 27.

Fig. 30, represents a scale usually employed in weighing salt, in the discharging of the cargoes of ships, and elsewhere; to which the above apparatus may be applied with good effect, as at G. The scale A, is suspended in a bale B, and when discharging its contents turns upon an axle, from which the required motion may be communicated to the registering apparatus.

Fig. 31, shows the registering apparatus adapted to record the measurement of any kind of articles. A, is the measure fastened to the band B, the arm C, of which has a pin or axle at D, turning in bearings on the table E. To the end of this axle is attached the registering apparatus G, which will record the movements of the measure when turned over to discharge its contents.

Fig. 32, is a representation of a trough or shoot, for the purpose of conveying cannon shots, shells, cheeses, bags, or any other articles which are usually allowed to run or slide down inclined planes from one place to

another. A, is a swinging door, hung upon an axle B. At the end of the shoot C, from whence the goods are delivered, the axle B, has a square end to receive the recording apparatus. D, D, are pins passing through holes in the pieces E, forming the end of the sides of the trough: in these pieces are several holes for the purpose of placing the pins higher or lower when requisite. F, F, are openings in the pieces E, through which the axle B, is passed. G, has a hole in the bottom of the trough, with pins by which the aperture at the end may be reduced or extended in width as required, the joints H, allowing the ends being contracted or extended. The axles of the swinging door rest on the pins D. On the square end of the axle is connected the apparatus D, which will indice or tally every time the swinging door is raised to let a shot or other article pass: the door may be loaded at the lower edge, to return it quickly to its first position.

These improvements in weighing machines are further exhibited in the several figs. 33, 34, and 35, and consists of an application of the registering apparatus and other contrivances to the determination and registry of the weights of carts, waggons, and other carriages with their contents in the gross; also, their respective weights separately, and the number of operations performed by the weighing machine, which is thus effected: *a, a,* are columns or supporters to the weighing apparatus or counterbalance to the weighing scale or platform and its load; *b, b,* is the weighted lever or steel guard, turning upon the fulcrum or axle *c,* attached to it, and turning in bearings in the collars *d, d,* placed in the columns, best seen at the section fig. 36; one of these collars projects to receive the nave of the wheel *e, e,* which is mounted upon it, from the nave of

which wheel protrudes the square axle *f, f,* to receive the recording apparatus, as shown more particularly at *f,* in the section at fig. 36. The wheel *e,* should be light, and of large proportions, and has formed round the outer and inner circumference of the rim, a corresponding number of small pointed teeth; *g,* is a spring bolt fixed on lever *b,* at its end are teeth corresponding to those on the outer circumference of the wheel *e*; *h,* is another spring bolt upon the column with teeth on it, which correspond with those on the inner circumference of the wheel *e.* The teeth of the bolt *g,* by means of its spring are forced into contact with them, while the spring of *h,* produces the contrary effect, keeping the teeth of that bolt out of contact with the teeth of the wheel; *i,* is a rod passing from near the weighing platform. The upper end of the rod *i,* is connected to an arm of the lever *k*: from the other end proceeds another rod *l,* supported, in bearing on the column, with an arm *m,* extending round one fourth of the circumference of the wheel *e*: on this arm the shank of the bolt *g,* traverses, according as the lever *b,* is elevated or depressed; the rod *l,* is also connected with spring bolt *h.*

Fig. 34, represents the action of the bolts *g,* and *h,* at a time when a carriage is supposed to be on the weighing platform, the bolt *g,* fastening the wheel *e,* to the lever *b,* by the teeth on its outer circumference, the bolt *h,* having receded from the inner teeth. On the rod *i,* being pulled, the lever *k,* is brought into action, and the effect is this:—

The spring of the bolt *g,* being forced forward, its teeth secures the wheel, and by the same motion the teeth of the bolt *h,* are withdrawn from the teeth on the

inner circle; the weight on the platform is then drawn off, when the lever *b*, resumes its quiescent state, taking with it the wheel *e*, and describing part of a circle proportioned to the weight that had been on the platform. When the rod *i*, is let go, the bolt *g*, recedes from contact with the outer teeth, and the bolt *h*, fixes the wheel *e*, by the inner teeth until the next operation. The registering apparatus is fixed on the axle *f*, of the wheel *e*, and by its motion an indice is made, that is by the rotary movement of the wheel *e*, while in contact with bolt *g*.

As the wheel *d*, has a rotary motion, instead of being restricted to an arc or segment, as in the foregoing weighing machine, it is necessary to make some variation in the construction of the recording apparatus, in order that it may be applied to this road or platform weighing machine. In fig. 37, *n*, represents the dial plate, on the axle of which is a square aperture to receive the axle *f*, of wheel *e*; *o*, is a pinion with ten teeth working in the wheel *p*, of one hundred teeth, the axle of which wheel *p*, has also a pinion *q*, of ten teeth working into another wheel *r*, of any requisite number of teeth, to extend the numeration of the quantity. The recording apparatus being connected to the wheel *e*, the operation is then as follows:—The wheel *e*, is governed by the action of the lever *b*, as before described; and as this lever is elevated according to the weight on the platform by the rod *s*, and returns upon the removal of the weight to its original position, a corresponding motion in the same radii must necessarily communicate to the dial plate *n*, which indices and exhibits the amount weighed according to the number of teeth or ratchets on wheel *e*, that have pro-

gressed in consequence of the operation before described. See the detached view of the indice and part of the dial plate, drawn on a larger scale at fig. 37.

The registering or recording of the several amounts of the individual weightings in their respective order is thus effected:—*t*, is a barrel wheel (see figs. 35 and 36,) fixed upon the axle *f*, and revolving with the wheel *a*; *u*,*u*, is a narrow length of parchment, or other substance, having a weight at each extremity, and passing once or more round the barrel *t*: this strip of parchment is conducted through an aperture in projecting studs, which serve as guides to steady and direct it. In the stud nearest the lever *b*, and opposite the aperture for the parchment is a small orifice on the lever *b*; and placed in the arc of the orifice is an incisor *v*, when, therefore, the lever *b*, ascends, the incisor ascends with it; upon the return of the same, the barrel wheel *t*, correspondingly rotates, and the weight *w*, attached to the parchment, ascends, and the weight *x*, on its other end, descends. Now, when the stud or incisor *v*, (in consequence of the return of the lever to its quiescent state) approaches to contact with the supporter *a*, it enters the orifice *y*, in the guide studs, and punctuates a hole in the parchment. Upon repetition of the operation, the same effect is produced; the number of operations is therefore recorded by the number of punctures; and the proportion which the distance they are from each other bears to the circumference of the wheel *g*, determines (upon admeasurement) their respective quantity in the order in which they were weighed, as elicited by a scale for that purpose. The gross record of the number of carts, waggons, or other carriages having passed the platform, is effected by the apparatus *s*, fixed upon the square end of the axle *c*, of the lever *b*. At the back of

the column the construction simply consists of the first portion of the registering apparatus, as applicable to the weighing shoot, as before described, it having a similar tongue and axis, *a*, *b*, (see fig. 38), acting upon ratchet wheel *c*, which contains an indefinite number of ratchets; the action of the lever *b*, describing a segment or circle only, as in the case of the weighing shoot A: therefore, one indice only at each operation is effected and recorded.

Fig. 39, is a partial sectional figure, showing the indicating or recording apparatus placed before the barrel wheel *t*.

## ORIGINAL COMMUNICATION.

*To the Editor of the London Journal of Arts, &c.*

ON SUGAR REFINING, AND DR. URE'S EXPERIMENTS.

(*Continued from page* 35.)

Previous to an analysis of these experiments, and for the purpose of enabling readers not versed in chemistry to understand the nature of those difficulties which Dr. Ure experienced, especially as to the loss of, or supposed unfair dealing with, his syrups, I purpose presenting a short notice of the nature and chemical properties of sugar. The juice from the sugar-cane from which the raw sugar is extracted, is expressed by mills constructed of two or three rollers, which are fed by thrusting the canes between them. The saccharine liquor so expressed is highly charged with other vegetable principles, and acid matter inimical to the crystallization of the sugar.

It is the object of the first process in the Colonies to free the liquor to be inspissated, as much as possible, from the heterogeneous substances combined with the saccharine matter. This is effected to a certain extent by the mixture of slaked lime with the liquor in the sugar-pans.

This process neutralises the malic and other vegetable acids

which the cane juice contained, and partly destroys the essential fixed oil; but the lime does not combine with the extractive principle, nor with the colouring matter and mucilage with which the saccharine juice is charged. It is only by the process of repeated crystallization *at a low temperature*, that the sugar can be obtained upon a large scale, free from the other vegetable principles with which it is combined. Lime or lime water acts chemically so far upon the saccharine principle, as partially to destroy its degree of intensity. The sugar thus treated is not so sweet as it otherwise would be; but this consideration is necessarily subjected to that of obtaining the proceeds by a rapid and extensive mode of operation. The fixed alkalies combine with sugar, but they destroy its sweetness more completely than does lime, and they are, therefore, less fit for use in the process of preparing the raw syrups.

If too much lime be used, sulphuric acid would precipitate the lime in a state of sulphate, and restore the original sweetness; but its use would tend to carbonise the sugar to a certain extent, and would render it less crystallizable. The hydrosulphurets and phosphurets of alkalies and of alkaline earths also decompose sugar, and reduce it to a mucilaginous state.

But the great destruction of the sugar is effected in the first process, by the intense fires placed under the large open pans used for evaporating the cane syrups. Charcoal is largely evolved, and pyromucous acid formed, which not only renders the mass mucilaginous and less crystallizable, but the process destroys the intensity of the saccharine quality, and renders the sugars actually produced and granulated less intrinsically valuable.

The mischief thus effected can never be remedied by any after process; but the various improvements made in sugar refining of late years, have a general tendency to prevent a further destruction of the saccharine matter, and to produce a greater quantity of crystallized sugar. The results to the parties using these modern and expensive improvements as to profit or loss, form no part of our present inquiry. I have, in the preceding letter, submitted my general opinion upon this subject.

The products of the decomposition of sugar by putting it into a retort, and subjecting it to the action of fire and slow distillation are,—water, acetic acid, oil, charcoal, carbonic acid, carburetted hydrogen gas, and pyromucous acid: this latter acid is by far the most abundant product. From 480 grains of refined sugar placed in a retort, and gradually heated to redness, the products were :—

| | |
|---|---|
| Pyromucous acid with a little oil - - | 270 grains. |
| Charcoal - - - - - - - | 120 " |
| Carburetted hydrogen, and carbonic acid gas | 90 " |
| | 480 |

| | |
|---|---|
| The primitive composition of sugar, according to Lavoisier, is of - - - | 100 parts. |
| Oxygen - - - - - - - | 64 " |
| Carbon - - - - - - - | 28 " |
| Hydrogen - - - - - | 8 " |
| | 100 |

The primitive form of the crystals of sugar is a four-sided prism, whose base is a rhomb. The crystals are usually four or six-sided prisms, terminated by two-sided or three-sided summits. The process of candy-making presents the formation and completion of large crystals in a very satisfactory manner.

It is obvious, from a consideration of the chymical analysis of sugar, that if quantity and quality were the only ultimate objects of the process, slow evaporation of the cane juice or of the syrups from raw sugars, should be the only object of the planters and manufacturers; but time, and expenditure in wages, food, clothing, &c., and, above all, in machinery and apparatus, must necessarily enter as principal subjects of calculation in a process so extensive and complicated. Considering the bearing of these material points upon the question of production, and the final one of profit, in a series of operations for a period of six or seven years, I think there is scarcely any improvement upon the prin-

ciple of slow evaporation that can be applied to the very attenuated juices of the cane submitted to the first process in the Colonies, that can, by superior production in quality and quantity, counterbalance, to any profitable extent, the heavy expenses, and in many cases the loss of season and market, attendant upon the introduction of such improvement. The introduction of the various patented improvements to the home refinery has effected every thing almost that can be desired, but the unscientific result of profit; about which no true philosopher would condescend to trouble himself, any more than the Government has in Dr. Ure's experiments.

Apropos! His name brings me back to my subject and his "painful necessity of concluding, that about seven cwt. of the sugar of the fifth experiment must have been abstracted and wasted in the clarifying stage, and nine cwt. of the sixth in the shape of the syrups of drainage."—Page 313. In the fifth experiment, Dr. Ure does not attribute its "enormous waste" to the scum being sent away "without undergoing the regular routine of washing and squeezing," nor "to the ordinary motives of theft," nor "to want of care in the officer," who always saw the raw sugar well mixed with *blood and water* in the melting-pan, after securing the upper floors of the house with locks."—Page 201. "Nor a drop of syrup lost in the pan," nor to any leakage in the large syrup, "it was proved to be perfectly sound and tight;" nor could the waste in this experiment "be ascribed to the frequent turning over of the syrup," nor to the want of uniformity of the boiling temperature, for that "seldom varied half a degree."—Vide page 200 to 203.

Amidst these negative dilemmas, the learned Doctor is completely involved; he extricates himself hypothetically. "The fill-house, where the copper stood *with its charge of blood and sugar*, could not be secured under the Custom-house key," because the stool-fire required to be looked after and supplied with fuel late and early. "If, therefore, any adequate motive were applied to an ill-principled mind, abundant facilities existed both in the evening and morning of the clearing days,

for destroying a considerable quantity of the sugar *(i. e. of blood and sugar)* left in the pan."

Now, supposing the "charge of blood and sugar" could have been repeatedly diminished to the amount of two or three cwt. out of a pan containing thirty-three cwt. of raw sugar, and have been *profitably* embezzled and conveyed off the premises; or even destroyed by some necromantic skill, in the pan, or sent down the common sewer without necromancy; and in either case without detection,—how was it possible for Dr. Ure and his boiler to have proceeded with the clearing and boiling, without seeing the *vacuum* caused in his open pan, by the abstraction of two to three cwt. of its charge, from a quantity not exceeding thirty-three cwt.? or how could the abstraction be possibly covered by filling up the pan with water, without entirely deranging the operation of clearing and subsequent boiling, which so large an addition of water must have affected? But all the subsequent processes of each day were conducted with that uniformity which is utterly irreconcileable with the Doctor's hypothesis.—How then is "the prodigious waste" of the fifth experiment to be accounted upon "fair principles?" I will endeavour to assist the learned Doctor, who forms one of many instances in which theory, uncombined with practical experience in extensive manipulations, will not help the owner. "Love laughs at locksmiths," so does sugar, and also at computations of produce "by the rule of three." There is a technical phrascology among the refiners, when raw sugar yields so uncertainly and badly, as in the case of the Doctor's fifth experiment, that "*the sugar has flown up the chimney.*" *This is literally the case;* and the experienced refiner knows the causes, and avoids the repetition of the disaster as far as may be, by not again purchasing in the raw market those marks in sugars which have this peculiar faculty, of clandestinely taking leave, by flying up the pan-chimney. The chemical cause of this peculiar species of volatility, I will explain in my next communication.

J. I. S.

# New Patents
## SEALED IN ENGLAND,
## 1834.

To John Twisden, of Halberton, near Tiverton, in the county of Devon, commander in the Royal Navy, for his invention of improvements applicable to inland navigation.—Sealed 24th July—6 months for inrolment.

To William Hale, of Colchester, in the county of Essex, civil engineer, for his invention of certain improvements in or on windmills, which improvements are applicable to other purposes.—Sealed 26th July—6 months for inrolment.

To William Coles, of Charing-cross, in the county of Middlesex, Esq., for his invention of a certain specific or remedy for the cure, alleviation, or prevention of rheumatic, gouty, or other affections arising from colds or other causes.—Sealed 26th July—6 months for inrolment.

To Pierre Barthelemy Gunibert Debac, of Acre-lane, Brixton, in the county of Surrey, professor of languages and mathematics, for his invention of an improved machine for weighing with the means of keeping a register of the operations of the instrument.—Sealed 26th July—6 months for inrolment.

To John Chanter, of Stamford-street, Blackfriars, in the county of Surrey, gentleman, and William Witty, of Basford-cottage, near Newcastle, in the county of Stafford, engineer, for their invention of an improved

method or improved methods of abstracting heat from steam, and other vapours and fluids applicable to stills, breweries, and other useful purposes.—Sealed 26th July —6 months for inrolment.

To Thomas John Hamilton, Earl of Orkney, and John Easter, engineer, both of Taplow, in the county of Bucks, for their invention of certain improvements in machinery or apparatus for propelling vessels on water. —Sealed 26th July—6 months for inrolment.

To Edmund Youldon, of Exmouth, schoolmaster, for his invention of improvements in preventing or curing what are termed smoky chimneys.—Sealed 5th August —2 months for inrolment.

To Lemuel Wellman Wright, of Sloane-terrace, in the parish of St. Luke, Chelsea, in the county of Middlesex, engineer, for his invention of certain improvements in machinery or apparatus for refrigerating fluids. —Sealed 9th August—6 months for inrolment.

To Thomas Gaunt, of Bridport-place, Hoxton, in the county of Middlesex, gentleman, for his invention of an improvement in earthenware pans or basins of water-closets, and certain other earthenware vessels to which such improvements are applicable.—Sealed 12th August—6 months for inrolment.

To Andrew Hall, of Manchester, in the county of Lancaster, manufacturer, and John Slark, the younger, of Chortten-upon-Medlock, in the said county, putter out, for their invention of improvements in the construction of looms for weaving by hand or power.— Sealed 12th August—6 months for inrolment.

To James Ward, of Stratford-upon-Avon, in the county of Warwick, watch-maker, for his invention of improvements in apparatus for ventilating buildings and other places.—Sealed 12th August—6 months for inrolment.

To Charles Arter, of Havant, in the county of Southampton, plumber and glazier, for his invention of certain improvements on cocks or taps for drawing off liquids.—Sealed 12th August—6 months for inrolment.

To James Pedder, of New Radford, in the county of Nottingham, machinist, for his invention of certain improvements applicable to certain machinery for making bobbin-net lace, for the purpose of making ornamented bobbin-net lace by the application to such machinery of any or all of the said improvements.—Sealed 13th August—6 months for inrolment.

To William Bruce, of the city of Edinburgh, Scotland, baker, for improvements in machinery or apparatus for making ship and other biscuit or bread, being a communication from a foreigner residing abroad.—Sealed 14th August—6 months for inrolment.

To Jacob Perkins, of Fleet-street, in the city of London, engineer, for his invention of improvements in the apparatus and means for producing ice and in cooling fluids.—Sealed 14th August—6 months for inrolment.

To Thomas De la Rue, of Finsbury-place, in the county of Middlesex, fancy stationer, for an improvement or improvements in manufacturing or preparing embossed paper hangings.—Sealed 15th August—6 months for inrolment.

To Keith Norman Thomson, of Holland-street, Blackfriars, in the county of Surrey, cork manufacturer, for his invention of certain improvements in machinery for cutting or making corks and bungs—Sealed 23d August—6 months for inrolment.

To John Rapson, of Penryn, in the county of Cornwall, engineer, for his invention of an improved apparatus for facilitating the steering of vessels of certain descriptions.—Sealed 23d August—4 months for inrolment.

To Robert Stein, of Walcot-place, Lambeth, in the county of Surrey, Esq., for his invention of certain improvements in certain engines to be worked by steam.—Sealed 23d August—6 months for inrolment.

To George Child, of Brixton, in the county of Surrey, gentleman, for an improvement or improvements in machinery for raising water and other liquids, being a communication from a foreigner residing abroad.—Sealed 23d August—6 months for inrolment.

To Webster Flockton, of Horsleydown, in the borough of Southwark, turpentine distiller, for his invention of an improvement in the manufacturing rosin.—Sealed 23d August—6 months for inrolment.

To James Slater, of Salford, in the county of Lancaster, bleacher, for his invention of certain improvements in addition to certain improved machinery for bleaching linen and cotton goods.—Sealed 23d August—6 months for inrolment.

## CELESTIAL PHENOMENA, FOR SEPTEMBER, 1834.

| D. | H. | M. | |
|---|---|---|---|
| 1 | | | Clock before the ☉ 0 m. 4 s. |
| | — | | ☽ passes the mer. 23 h. 4 m. |
| 2 | 2 | 7 | ☿ in conj. with the ☽ diff. of dec. 3. 10. S. |
| 3 | 1 | 22 | ♃ in quadrature with the ☉ |
| | 2 | 51 | Ecliptic conj. or ● new moon. |
| 4 | 12 | 0 | ☽ in Perigee. |
| | 23 | 51 | ♄ in conj. with the ☽ diff. of dec. 2. 48. S. |
| 5 | | | Clock before the ☉ 1 m. 20 s. |
| | — | | ☽ passes the mer. 1 h. 47 m. |
| | — | | Mer. R. A. 10 h. 17 m. dec. 12. 27. N. |
| | — | | Ven. R. A. 13 h. 35 m. dec. 11. 0. S. |
| | — | | Mars R. A. 5 h. 29 m. dec. 22. 58. N. |
| | — | | Vesta R. A. 4 h. 10 m. dec. 13. 26. N. |
| | — | | Juno R. A. 19 h. 2 m. dec. 9. 49. S. |
| | — | | Pallas R. A. 12 h. 37 m. dec. 7. 46. N. |
| | — | | Ceres R. A. 12 h. 40 m. dec. 3. 19. N. |
| | — | | Jup. R. A. 4 h. 37 m. dec. 21 13. N. |
| | — | | Sat. R. A. 12 h. 40 m. dec. 1. 52. S. |
| | — | | Georg. R. A. 21 h. 46 m. dec. 14. 18. S. |
| | — | | ☿ passes the mer. 23 h. 24 m. |
| | — | | ♀ passes the mer. 2 h. 38 m. |
| | — | | ♂ passes the mer. 18 h. 31 m. |
| | — | | ♃ passes the mer. 17 h. 38 m. |
| 6 | 1 | 51 | ♀ in conj. with the ☽ diff. of dec. 5. 46. S. |
| 7 | 12 | 36 | ♃'s first sat. will im. |
| | 13 | 29 | ♃'s third sat. will im. |
| | 15 | 43 | ♃'s third sat. will em. |
| 8 | 15 | 35 | ☿ greatest Hel. Lat. N. |
| 9 | 17 | 26 | ☽ in □ or first quarter. |
| 10 | | | Clock before the ☉ 3 m. 1 s. |
| | — | | ☽ passes the mer. 6 h. 17 m. |
| 14 | 14 | 29 | ♃'s first sat. will im. |
| | 19 | 32 | ♅ in conj. with the ☽ diff. of dec. 3. 46. N. |
| | — | | Occul. ϵ in Capri, im. 11 h. 29 m. em. 12 h. 36 m. |
| 15 | | | Clock before the ☉ 4 m. 46 s. |
| | — | | ☽ passes the mer. 10 h. 37 m. |
| 16 | 10 | 4 | ♃'s second sat. will im. |
| | 12 | 22 | ♃'s second sat. will em. |
| 16 | 15 | 22 | ☿ in sup. conj. with the ☉ |
| 17 | 11 | 18 | Ecliptic oppo. or ○ full moon. |
| | — | | Occul. 6 in Piscium, im. 14 h. 34 m., em. 15 h. 17 m. |
| 19 | 14 | 17 | ♂ in the ascending node. |
| | 17 | 0 | ☽ in Apogee. |
| 20 | | | Clock before the ☉ 6 m. 21 s. |
| | — | | ☽ passes the mer. 14 h. 5 m. |
| 21 | 16 | 23 | ♃'s first sat. will im. |
| 23 | 10 | 51 | ♃'s first sat. will im. |
| | 12 | 41 | ♃'s second sat. will im. |
| | 15 | 0 | ♃'s second sat. will em. |
| 24 | 12 | | ♀ in Aphelion. |
| 25 | | | Mer. R. A. 12 h. 33 m. dec. 2. 39. S. |
| | — | | Ven. R. A. 14 h. 59 m. dec. 19. 38. S. |
| | — | | Mars R. A. 6 h. 16 m. dec. 23. 32. N. |
| | — | | Vesta R. A. 4 h. 19 m. dec. 13. 18. N. |
| | — | | Juno R. A. 19 h. 7 m. dec. 11. 49. S. |
| | — | | Pallas R. A. 13 h. 12 m. dec. 5. 56. N. |
| | — | | Ceres R. A. 13 h. 12 m. dec. 0. 31. S. |
| | — | | Jup. R. A. 4 h. 41 m. dec. 21. 20. N. |
| | — | | Sat. R. A. 12 h. 49 m. dec. 2. 49. S. |
| | — | | Georg. R. A. 21 h. 43 m. dec. 14. 31. S. |
| | — | | ☿ passes the mer. 0 h. 17 m. |
| | — | | ♀ passes the mer. 2 h. 43 m. |
| | — | | ♂ passes the mer. 17 h. 59 m. |
| | — | | ♃ passes the mer. 16 h. 23 m. |
| | — | | Clock before the ☉ 8 m. 16 s. |
| | — | | ☽ passes the mer. 17 h. 59 m. |
| | 15 | 6 | ☽ in □ or last quarter. |
| | 18 | 2 | ♂ in conj. with the ☽ diff. of dec. 1. 0. S. |
| 27 | 21 | 10 | ☿ in conj. with ♄ diff. dec. 1. 54. S. |
| 28 | 17 | 42 | ♂ in quadrature with the ☉ |
| 30 | 5 | 44 | ♃ stationary. |
| | 15 | 18 | ♃'s second sat. will im. |
| | 17 | 37 | ♃'s second sat. will em. |

J LEWTHWAITE, Rotherhithe.

# METEOROLOGICAL JOURNAL,

## FOR JULY AND AUGUST, 1834.

| 1834. | Thermo. | | Barometer. | | Rain in inches. | 1834. | Thermo. | | Barometer. | | Rain in inches. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hig. | Low. | High. | Low. | | | Hig. | Low. | High. | Low. | |
| July | | | | | | Aug. | | | | | |
| 26 | 79 | 55 | 29,86 | 29,81 | | 11 | 75 | 54 | 30,16 | 30,15 | |
| 27 | 67 | 50 | 29,79 | 29,75 | ,225 | 12 | 79 | 51 | 29,99 | 29,92 | |
| 28 | 79 | 55 | 29,93 | 29,91 | | 13 | 82 | 54 | 29,96 | 29,91 | |
| 29 | 80 | 52 | 29,95 | 29,92 | ,65 | 14 | 80 | 51 | 30,09 | 30,04 | |
| 30 | 75 | 53 | 29,82 | 29,81 | ,65 | 15 | 76 | 49 | 30,15 | 30,13 | |
| 31 | 74 | 51 | 29,78 | 29,76 | ,05 | 16 | 79 | 55 | 30,09 | 30,05 | |
| Aug. | | | | | | 17 | 78 | 57 | 30,01 | 29,97 | |
| 1 | 77 | 55 | 29,77 | 29,73 | ,05 | 18 | 75 | 58 | 29,92 | 29,87 | |
| 2 | 75 | 56 | 29,83 | 29,82 | ,025 | 19 | 75 | 58 | 29,80 | 29,72 | |
| 3 | 76 | 50 | 29,80 | 29,79 | | 20 | 73 | 54 | 29,67 | 29,63 | |
| 4 | 77 | 51 | 29,82 | 29,80 | | 21 | 76 | 56 | 29,79 | 29,67 | |
| 5 | 74 | 50 | 29,86 | 29,84 | | 22 | 75 | 58 | 29,86 | 29,85 | |
| 6 | 70 | 48 | 29,81 | 29,78 | | 23 | 70 | 51 | 29,80 | 29,70 | |
| 7 | 70 | 48 | 29,86 | 29,84 | ,225 | 24 | 63 | 46 | 29,57 | 29,51 | |
| 8 | 72 | 50 | 29,80 | 29,78 | ,575 | 25 | 61 | 41 | 29,54 | 29,50 | ,7 |
| 9 | 73 | 51 | 29,91 | 29,84 | ,275 | | | | | | |
| 10 | 75 | 49 | 30,09 | 30,01 | | | | | | | |

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

THE

# London

## JOURNAL OF ARTS AND SCIENCES,

AND

## REPERTORY

OF

## PATENT INVENTIONS.

*CONJOINED SERIES.*

No. XXX.

## Recent Patents.

*To* JOSHUA WORDSWORTH, *of Leeds, in the county of York, machine maker, for certain improvements in machinery or apparatus for heckling flax, hemp, and other fibrous substances requiring such process.*— [Sealed 6th December, 1833.]

MY improvements in machinery or apparatus for heckling flax, hemp, and other fibrous substances requiring such process, consists in the adaptation and peculiar arrangement of certain implements or apparatus constituting a machine in which a succession of stricks of flax, or other like materials, may be subjected to the operation of several series of revolving heckles of different degrees of fineness for the purpose of gradu-

ally separating or opening the long fibres of the flax or other materials, and combing or dressing them smooth; at the same time the tow or entangled refuse portions of the material taken off from the stricks by the heckle points is removed from the heckles by rotatory brushes and rollers covered with wire cards, and discharged into suitable receivers, from whence it may be taken to a carding engine, to be worked in the ordinary way.

The accompanying drawings (see Plate V,) represent in several figures a machine for performing the heckling process in the way stated, in which machine the operative parts are all repeated, that is, the machine is made double, for the purpose of allowing two series of stricks of flax, or other material, to be acted upon at one time. Fig. 4, is a horizontal view of the machine; fig. 5, is a side elevation of the same; and figs. 6 and 7, are end views, the whole being represented in working order; and in which several figures, the respective letters of reference point out corresponding parts of the machine.

A, A, are two large barrels or drums, upon the surfaces of which are fixed longitudinally several series of brass ribs *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, *i*, holding heckle points. These ribs are placed at small distances apart round the barrels, all the heckle points standing radially from the axes, and the barrels are mounted upon axles supported by pedestals, with plummer blocks bearing on the rails of the end frames. B, B, are two horizontal wheels or pulleys turning upon vertical shafts, which pulleys conduct an endless chain C, C, C, C, carrying the holders, from whence the stricks of flax, or other material intended to be heckled, are suspended.

At one end of the axle of each of the barrels a toothed wheel D, D, is affixed, and these are connected by a

similar wheel E, and a pinion F, the latter of which is fixed upon the axle of the driving rigger G.

The power of a steam engine, or any other first mover, being applied by a band and rigger, or otherwise, to the axle of G, the pinion F, is driven round, which, through the agency of the toothed wheels E, and D, D, geared thereto, causes the heckle barrels A, A, to revolve simultaneously in opposite directions, as shown by the arrows in figs. 6 and 7.

The stricks of flax intended to be operated upon are severally confined between pairs of clamps *k*, fastened together, which clamps, with the stricks, are then suspended in their respective holders H, H, attached to the endless chain C: the lower portions of the flax hanging down for the purpose of being acted upon bythe rotary heckles, while the upper portions are turned up in loops, and confined by spring levers attached to each carrier.

The respective holders of the clamps consist of a forked frame, with hooks at the lower parts of their arms, which receive the ends of the clamps *k*, that confine the strick of flax. From the upper part of each forked frame a perpendicular pin extends, which pin, when inserted into the sockets *l*, *l*, *l*, in front of the chain, form axles for the frames to turn upon at certain periods of the operation.

On the upper end of each pin a small arm or tappet piece *m*, is fixed, standing at right angles to the face of the forked frame of the holder H. These tappets, as the endless chain conducts the holders along at certain periods, come in contact with stationary pins or wipers *n*, *n*, fixed to the guide rails *o*, on which the chain C, slides; and these wipers acting against the tappets as they pass, cause the holders to be turned

round at those periods for the purpose of bringing the reverse side of the strick of flax on to the heckle points.

Let it now be supposed that all the holders connected to the endless chain have been furnished with stricks of flax or other material to be heckled, and that the barrels A, A, are put in motion in the way described, revolving in the direction of the arrows shown in figs. 6 and 7. A pinion I, on the end of the axles of one of the barrels A, (see fig. 7,) will drive a train of toothed gear J, K, L, M, and N, on the axle of the latter, of which there is a bevelled pinion O, taking into a bevelled wheel P, turning horizontally at the lower end of the perpendicular shaft of one of the chain pulleys B (see figs. 5 and 7). It will hence be perceived that as the barrels go round such rotatory motion will be communicated to the pulley B, as will cause it to drive the chain C, forward, and by that means conduct the several stricks of flax progressively along the barrel.

When each successive holder, with its strick of flax or other material, is brought to the part *z*, (fig. 4,) the fibres come into contact with the rotary barrel, and first strike upon the series of coarse heckles *a*, *a*, placed upon an inclined or conical surface of the barrel, by which means the lower ends of the flax in each strick is first acted upon; and as it advances, the upper part, and ultimately the whole length of the long fibres of the suspended strick, is gradually brought on to the heckles; which progressive operation prevents the long fibres from being broken, and causes a smaller quantity of tow to be produced than is usually taken off in any of the ordinary modes of heckling.

After the strick of flax or other material has been carried by the travelling chain past the first inclined or

conical surface *a*, of the heckling barrel, it then comes upon the cylindrical part *b*, of the barrel, which is also furnished with coarse heckles that penetrate and comb down the whole pendant lengths of the fibres. But in order that both sides of the strick of flax may be equally operated upon, the holder is now to be turned round upon its pin or pivot, which movement is effected by one arm of the lever or tappet *m*, (as the carrying chain moves onward) coming against the stationary pin or wiper *n*, which changes the position of the holder, as shown at *p*, in the horizontal view, fig. 4.

The under part of the guide rail *o*, upon which the chain slides, is at this part cut away, for the purpose of allowing the holder to turn round horizontally; and a pin or projection at the under side of the guide rail, as the chain continues moving, acts against the side of the carrier frame, and forces it into a position parallel with the chain. The other side of the strick of flax is by these means brought on to the heckles of the second inclined or conical surface of the barrel at *c*; and the travelling chain proceeding onward, the fibres of the material are in succession passed over and combed by the heckles of increasing fineness *d*, *e*, and *f*, on the cylindrical part of the revolving barrel, until the strick having arrived at the second wiper *n*, the frame or holder is at *q*, turned round as before, and the reverse side of the strick, or that first operated upon by the heckles *a*, and *b*, is brought progressively on to the heckles of increasing fineness *g*, *h*, and *i*; and having passed the last series of rotary heckles, the holders are in succession to be removed from the machine, the material having been sufficiently dressed.

The clamps of the holders are now opened by the attendant, and the stricks of flax or other material are

taken out, and again placed between the clamps in reversed positions, in order that the other ends of the fibres may be operated upon. The clamps, with the stricks, are then suspended again in the holders, the uncombed ends of the fibres hanging down upon the heckle barrel.

In order to avoid interrupting the continual operation of the machine, it is proposed that the strick on its second introduction shall be placed in the holders on the opposite side at *y*, which is one of the reasons for constructing a double machine, and the strick being thence carried along by the travelling endless chain in the way already described, the fibres will be first brought under the operation of the coarse heckles on the inclined or conical surface of the second revolving barrel, and then of the other heckles increasing in fineness on the cylindrical part of the barrel, until having reached the end, as in the former instance, the fibres of the flax may be considered to be sufficiently dressed, and may then be withdrawn.

It may be necessary here to remark, that as different kinds and qualities of material will require different degrees of working by the heckles, this can be effected by varying the comparative speeds of the travelling holders and the heckle barrels. These comparative speeds, it will be perceived, depend upon the diameters of the wheels and pinions by which the pulley B, is driven from the rotation of the heckle barrel. These wheels and pinions are therefore intended to be removed and changed for others of different diameters, as circumstances may require. It will be perceived that the faster the stricks travel through the machine compared to the rotary speed of the heckle barrels, so much the less will the material be acted upon by the rotary

heckles; but as different qualities of material must be differently operated upon, according to circumstances, it is impossible to set out any definite speeds or proportions of speed: that will however be readily perceived by competent workmen when working at the machine.

In the process of opening the fibres of the material by the rotary heckles, a quantity of short or loose fibres, as tow, will be taken off the stricks by the heckle points, and will remain adhering to the barrel between the points of the heckles: in order therefore to remove this tow, or other loose entangled material from the heckles, several series of brushes, or blocks with bristles, are affixed longitudinally to rotary barrels Q, Q.

These brush barrels are mounted parallel to the heckle barrels upon axles, supported in plummer blocks affixed to brackets extending from the end frames of the machine. Those parts of the brush barrels which are opposite to the cylindrical portions of the heckle barrel are cylindrical, and those parts which are opposite to the bevels are contra-bevelled, or made as frustrums of cones reversed, or in an opposite angle, as *r*, *s*, so as to run parallel to the inclined surfaces of the heckle barrels *a*, and *c*.

Upon the periphery of these barrels Q, Q, ribs, or blocks with bristles or brushes, are fixed longitudinally at suitable distances apart, the bristles all standing radially from the axle, and taking into the points of the heckles.

Rotary motions are given to the brush barrels Q, Q, by bands passing from the riggers at G, over pulleys R, R, fixed at the end of each of the axles of the brush barrels. Hence it will be perceived that the barrels Q, Q, will revolve in opposite directions to the heckle

barrels, and with sufficient speed to enable the brushes to pass through between the points of the heckles, and in so doing, to remove the tow or other loose matter therefrom.

The tow or other loose fibrous material collected upon the brushes is transferred thence on to wire cards placed round the periphery of the barrels S, S, which barrels are mounted upon axles parallel to the brush rollers, and turn in plummer blocks upon brackets, extending from the end frames of the machine.

These barrels are cylindrical, and covered with sheets of wire cards at those parts which are opposite to the cylindrical portions of the brush barrels, but those portions of the barrels S, which are opposite to the bevelled parts *r*, and *s*, of the brush barrels, are bevelled or made conical at *t*, *u*, to fit or correspond with the inclined surfaces *r*, and *s*; these are covered with sheets of wire cards also.

Rotary motions are communicated to the card barrels S, S, by bands from the pulley T, fixed on to the side of the toothed wheel M, (see figs. 6 and 7,) which band drives similar pulleys V, V, mounted upon studs fixed in the end frame. Upon the side of each of these pulleys V, a pinion *t*, is fixed, which pinion takes into the teeth of the wheel W, on the end of the axle of each of the card barrels S, S; by which means such slow motions are given to the barrels S, as will allow the brushes of the barrels Q, to comb off, and deposit the tow or other fibrous material upon the wire cards as they revolve, and from whence it is to be removed by a doffing comb, and let fall into any convenient receptacle below, in same way as in ordinary carding engines.

The doffing combs X, X, X, are formed to the shape of the card barrels, and are attached to straight bars ex-

tending along the machine on both sides, which are supported at their extremities by levers Y, Y, vibrating upon fulcrum pivots at *w*, *w*. To these levers perpendicular rods Z, Z, are connected by joints, and the lower end of each of these rods is attached to an excentric disk, roller, or crank *x*, *x*, on the axle of the brush barrel; whence it will be perceived that by the rotation of the excentrics *x*, the levers Y, will be made to vibrate and strike off, or doff the tow or other material from the card barrels, in a similar manner to the operations of the doffing comb of an ordinary carding engine.

Having now described fully the construction and mode of using my improved machinery or apparatus for heckling flax, hemp, and other fibrous substances requiring such process, I desire it to be understood, first, that I do not confine myself to the double construction of machines shown in the drawings, as a machine with one heckling barrel, one brush barrel, and one card barrel, would perform the same operations to a certain extent, but I claim the general arrangement of the operative parts of the machine for the purpose of heckling, whether constructed single or double; and I claim as a particular and important portion of my invention, placing the first or coarser heckles upon inclined surfaces, by which the ends of the fibres, and afterwards the more compact parts of the strick, are gradually brought into the heckles; and also turning the strick round at certain parts of the operation, for the purpose of operating equally upon both sides of the strick.—[*Inrolled in the Rolls Chapel Office, June*, 1834.]

Specification drawn by Messrs. Newton and Berry.

*To* THOMAS BAKER, *of Upper Stamford-street, in the county of Surrey, gentleman, for certain improvements in the construction or mechanism of chronometers, watches, and clocks, and which may also be applied to other mechanical purposes, being a communication from a foreigner residing abroad.*—[Sealed 20th March, 1834.]

THE invention of certain improvements in the construction or mechanism of chronometers, watches, and clocks, and which may also be applied to other mechanical purposes, has been communicated to me in the following words:—

"This invention consists in the application of the excentric movement, and that produced by the centrifugal force in the construction of chronometers, time-keepers, clocks, and watches, and by which means I avoid a number of inconveniences attending the above-named machines, and render them less liable to disarrangement.

"To elucidate this construction, I place on one of the arms of the wheel (see plate V, fig. 8) a pivot A: this pivot is connected by the excentric bar B, to the end of the lever C, moving freely on its axis; the wheel in this figure being put in motion by the main spring and wheels connected with it, every revolution of the excentric wheel mark and beat seconds, the same as a pendulum of a clock of the usual length. This excentric communicates by pinions and wheels to the balance shown in fig. 9. In that figure, E, E, are regulating balls connected to the balance D, at its extremities, and by means of the lever G, G, which moves freely on the pin S, the centrifugal force causes the balls E, to fly outward.

"The tooth I, of the lever G, by these means, is pressed on the spring F, and which prepares it to act against the fixed plate M; by this means a constant and uniform movement is produced in the balance, and the number of its revolutions per minute determined.

"Fig. 10, represents the outline of a caliper for a chronometer, which, however, may be varied according to the will of the artist, in this as well as in all other timepieces.

"The invention consists in the application of the excentric movement, and that of centrifugal force to all instruments made use of for the above purpose."

Reference to fig. 10: *a*, barrel; *b*, centre pinion; *c*, centre wheel; *d*, second wheel pinion; *e*, second wheel; *f*, pinion of the third wheel; *g*, third wheel; *h*, pinion of the fourth wheel; *i*, fourth wheel; *j*, excentric pinion; *k*, excentric wheel; *l*, connecting pinion; *n*, wheel; *m*, balance pinion; *o*, balance.—[*Inrolled in the Rolls Chapel Office, September*, 1834.]

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*To* JAQUES FRANCOIS VICTOR GERARD, *of Redmond's-row, Mile-end, in the county of Middlesex, for certain improvements in the means of finishing silks, woollens, cloths, stuffs, and other substances requiring heat and pressure, being a communication from a foreigner residing abroad.*—[Sealed 8th February, 1834.]

THIS invention applies to the hot-pressing of cloths, that is, submitting them to pressure with heat, as the last operation of finishing; which is designed to smoothen and produce a gloss upon the surface of the goods.

In the ordinary mode of hot-pressing, smooth sheets

of card-board are placed between the folded surfaces of the cloth, previously to their being placed in the press; and at certain distances apart, hot plates of iron are introduced between the several pieces, for the purpose of communicating heat throughout the whole, while the cloth is under pressure.

The construction of press to be employed, forms no part of the present improvement; the invention consisting in the adaptation of steam boxes, to be applied in place of the hot iron plates heretofore used.

Plate V, fig. 11, is an elevation of the press, with the improvements adapted thereto. This press is of the ordinary kind, formed of wooden uprights and cross-beams *a*, *a*, *a*, with a screw shaft *b*, *b*, in the middle, by the descent of which the pressure upon the cloths is produced. The steam boxes *c*, *c*, *c*, are shown introduced between the several pieces of folded cloth.

One of the steam boxes *c*, is shown detached in the horizontal view, fig. 12, the top of the box being removed to exhibit the bent pipe within, through which the steam circulates.

The box is described in the specification as made of wood (a most unfit material, as we should suppose, for conducting the heat), in which wood the pipe of metal is imbedded. The steam is intended to enter the pipe at *d*, and to make its exit at *e*. By reference again to the elevation, fig. 11, the management of this apparatus will be understood.

The goods intended to be pressed, having been folded properly with glazed press papers or card-boards between their surfaces in the usual manner, they are placed in the press, as shown, with the steam-boxes *c*, *c*, *c*, intervening between the several folded pieces. When this is done, the screw *b*, is to be turned, and the press

brought down, so as to pinch the goods. The transverse pipes *f, f, f,* are then placed obliquely, and connected to the ends of the pipes in the several boxes by means of union screw couplings made steam-tight, which will form a continued steam communication through all the series of boxes *c, c, c,* from the bottom to the top, however many there may be.

In order to heat the several boxes, steam is now to be admitted into the lower one, by a pipe *g, g,* leading from a steam boiler, the pipe being furnished with a stop-cock, for letting on, or shutting off, or regulating the steam. By these means the steam will be made to pass upwards through the whole series of boxes, and to heat them and the goods under pressure; and any water that may be produced by condensation will flow to the bottom, and may be drawn off by a cock into the tank or vessel *h*, below.

When the operation of pressing has been continued a sufficient length of time, the boxes and the goods are to be cooled by a flow of cold water, which may be passed through the series, by a pipe *i*, connected thereto, leading from a cold water tank *k*, placed above.

The Patentee claims heating the cloths under pressure by means of hollow shelves (boxes) heated by steam or hot air in place of hot iron plates, and the employment of the two tanks for the supply and reception of the cold water in cooling them.—[*Inrolled in the Inrolment Office, August,* 1834.]

It will be seen that the essential feature of this invention—heating the plates by steam in the operation of pressing cloths—has been anticipated, and a patent granted for the contrivance to Messrs. Lord, Robinson,

and Forster, of Leeds, dated 11th August, 1825. (See London Journal of Arts, First Series, vol. xi., page 5.) It is therefore obvious, that though the present invention may contain some improvements in the detail of the apparatus, and the mode of putting the plan into operation, yet the patent right cannot be exercised during the term of the former grant without license from the original Patentees.—EDITOR.

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*To* HENRY CRANE, *of Wolverhampton, in the county of Stafford, merchant, and* JOHN YOUNG, *of the same place, patent lock manufacturer, for their invention of certain improvements in the making or manufacturing or forming of iron hoops for casks, and other purposes* —[Sealed 20th March, 1834.]

THESE improvements in making or manufacturing and forming of iron for hoops for casks, and other purposes, consists in giving to the narrow strips of hoop iron a curved figure; that is, bending the strip of iron from the usual straight form in whic hthey are delivered by the ordinary operation of rolling, into such a curve suited to the diameter of the barrel round which the hoops are intended to bind, as will enable them, when formed, to lay close to the conical or elliptical surface of the barrel. This is effected by a peculiar method of acting upon the strips of iron by means of rollers, in order that such required lengths of iron, when cut off and bent round into the circular hoop shape, may be formed slightly tapering, or as the frustrums of cones.

The method by which this is effected, is by drawing out the bar or rod of iron by rolling in the first instance

in a heated state in the usual way, until it has been reduced to nearly the required thickness: we then set the rollers, so that their axles incline at a slight angle from the true parallelism, by which means the peripheries of the rollers will be nearer together at one end than at the other, and the strips of iron being then passed between these inclined rollers, will be necessarily compressed, or formed on one edge thicker than at the other edge—that is, of a wedge shape, if cut in a transverse section. This may be done by relieving the screws which confine the axle at one end, and tightening them at the other end; or the same might be effected by making the grooves and ribs of the two rollers inclined to each other, instead of parallel.

When the strip of iron has assumed this wedge shape, in its transverse sectional figures, we then pass it in its heated state between a pair of parallel rollers, which, by pressing principally the thicker part of the substance of the strip of iron, causes that thick part to expand and elongate more than the thinner part of the strip, and, consequently, to extend or elongate the strip more on one edge than on the other.

This mode of operation will cause the strip of iron, as it is discharged from the parallel rollers in the last instance, to assume the form of a regular curve, and which curve may be varied to suit any required diameter and inclination of the surface of the cask or barrel, by varying the inclination of the rollers or the bevel of the groove, by which the strips are compressed into the wedge shape, that is, thicker on one edge than on the other; and in order to prevent the strip of iron from bending into irregular curves, as it passes in its heated state from the rollers, we have found it useful to place a curved guide or conductor near the rollers,

which will enable the workman, as he draws out the strip of iron from the rollers, to preserve its desired figure with great accuracy.

Lastly, we wish it to be observed, that as the rolling of iron for the purpose of bringing it into thin and narrow strips for the manufacture of hoops is not new, of course that process is not to be considered as claimed by us; but the taking of strips of iron previously made thicker on one edge than on the other, and passing them between parallel rollers for the purpose of expanding the metal on one side of the strip more than on the other side, and thereby giving to the strip a curved figure as it is discharged from the rollers, being, to the best of our knowledge and belief, new, and never before employed by any other person or persons in the manufacturing of hoops, we claim that mode of operation as our invention, and forming the essential feature of our present patent right.—[*Inrolled in the Rolls Chapel Office, Sepetmber*, 1834.]

Specification drawn by Messrs. Newton and Berry.

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*To* WILLIAM NORTH, *of Stangate-wharf, Lambeth, in the county of Surrey, slater, for his invention of an imrpovement in roofing or covering of houses or other buildings or places.*—[Sealed 29th January, 1833.]

THIS improvement in roofing or covering of houses and other buildings, consists in a peculiar mode of attaching slabs of slate to the rafters of the building.

The mode in which the Patentee has described his invention is rather confused; but, that we may not mis-

represent his intentions, we give the words of the specification, as far as the description goes :—

" My improvement partly consists in laying and retaining upon the wooden or iron rafters of roofs, slates or slabs of slate, each of which, with the exception of those used in the lower tier of all, is raised at its lower end, by means of a fillet of slate, lead, or other metal, or of mastic composition attached to the under side of the slate or slab ; which fillet, excepting when laid on slates or slabs of slates of uneven surface, is scolloped on its under side, more or less, as may be required, so as to admit air from without to the timbers of the roof, and to let steam, heat, and damp, escape from within.

" My said improvement further consists in laying or retaining upon the wooden or iron rafters of such roofs, slates or slabs of slate, each of which, with the exception of those used in the upper tier of all, has attached to the top side of the upper end of each a fillet of slate, lead, or other metal, or of mastic composition, smaller than the fillet before described; and the upper end of the slate or slab to which the smaller fillet is attached, being overlapped by the lower end of the slate or slab to which the larger fillet is attached, the smaller fillet excludes wet from without, while it does not prevent the air from being admitted to the timbers of the roof from without, or steam, heat, or damps escaping from within, which completes the horizontal joints.

" Further, on the under side of each slate or slab, a groove is cut at each side, the outer edges of which overlap the edges of a slate or iron bearer, which has a corresponding groove sunk on each side of its upper surface, forming a channel for the discharge of such water as may get into the vertical joints."

The Patentee then says, in order that his invention

may be the better understood, he shall describe the whole process of roofing buildings; and, referring to a sheet of drawing, proceeds as follows:—

"The slates or slabs of slates are in thickness from half an inch to an inch, according to the required strength, and in length from two to six feet, and in width about two-thirds the length.

"On the under side of each slate or slab, a groove is formed at each of its sides of about three-quarters of an inch wide, and one-quarter deep, shown in Plate VI. at fig. 1, *a*, *a*. At the under side of the lower end of each slate, excepting those used in the bottom tier or eave-course, there is a groove about three-eighths of an inch wide and one-eighth deep, into which is fastened, by means of mastic or cement, a fillet of slate, or of lead, or other metal, as *b*, fig. 2, about three-eighths of an inch wide by five-eighths deep: the lower edge being scolloped, as shown in fig. 1, according as little or much ventilation may be required; or it need not be scolloped, if the face of the slate upon which it bears is of an uneven surface.

"Upon the upper side of the top end of each slate (excepting those used in the upper tier of all) a fillet of mastic, or of slate or lead, is laid about half an inch wide and a quarter thick, as shown at *c*, fig. 2. But it should be observed, that I generally use a fillet of lead for the bottom end, on account of its exposure to the weather, and its flexible quality in bending to the unevenness of the slate, and a fillet of mastic for the top end, on account of its adhesive quality, and being partly protected from the weather.

"The bearers upon which the sides of the slates or slabs bear, forming the vertical joints, are of slate or iron from one to two inches thick, of the same length

as the slates, and about three inches wide, with a groove about half an inch wide and half an inch deep on each side of the upper face, see fig. 1, *d*, *d*, *d*.

"The method of fixing the improved roofing is represented at fig. 3. The wooden or iron rafters must be placed horizontally, of sufficient distance apart to allow of the top end of the slates having two inches bearing, and at bottom, end to overlap the slate below about two inches. The principals or binders are about eight feet apart. The slate or iron bearers are sunk, and nailed at the upper ends a sufficient depth into the rafters, to allow of the slates or slabs bearing equally upon the rafters and upon the bearers, the bottom ends overlapping the heads of the slates below about two inches, and the sides of the slates or slabs overlapping the sides of the bearers, fastened at the bottom ends, with metal loops *e*, *e*, shown detached, and in two positions, at fig. 4, which are countersunk into the face of the slates and nailed to the rafters."—[*Inrolled in the Inrolment Office, July*, 1833.]

Specification drawn by the Patentee.

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*To* GEORGE HARRIS, *of East Dulwich, in the county of Surrey, Esq., for a method of reducing and preparing various vegetable substances (not hitherto in use for the like purpose), for the manufacturing them into articles in general use, heretofore usually made from hemp and flax.*—[Sealed 1st June, 1833.]

THE Patentee proposes to employ the branches of palm, and a great variety of other fibrous plants found growing in abundance in the tropical regions of Asia,

Africa, and America, in the West Indies, and near the Cape of Good Hope, which, by his improved mode of treatment, may be reduced to a very fine fibrous texture, and employed for weaving into cloths and other fabrics, instead of flax or hemp.

Many of these plants contain a pulpy substance within their bark, which may be separated by slitting such of the stalks as require it, and, after steeping them in hot or cold water for twenty-four hours or more, passing them between rollers, in the same way that sugar-canes are treated. The fibres are then to be tied up in bundles, and placed in a running stream, or otherwise treated, for the purpose of washing them free from the gelatinous parts of the pulp, after which they may be dried in the open air and sun, and are ready for packing and transportation.

In this state of preparation, these materials are to be obtained from the natives of the countries in which they grow; the Patentee, therefore, does not claim this as any part of his invention, but only describes it as the necessary mode of preparation abroad, previously to its being brought to market for exportation into this country.

The present invention consists in a further process or operation, to which the material is to be submitted after it has arrived in Europe, for the purpose of separating its fibres and rendering them fit for the subsequent heckling and spinning into fine yarns.

The hanks of the material partially prepared as above, being opened, are to be spread out in layers of about half an inch thick, and in this way are to be placed within a vessel, as a boiler of copper, or a vat, or other suitable apparatus; and between each of the layers of the material, the fibres of which should cross

each other, a quantity (the amount of which is not stated) of soda, potash, or pearlash, and quick-lime, in equal proportions, is to be spread; and when the boiler is filled, the upper part is to be sprinkled with sea water, until the vessel is full of the liquid: or in place of sea water, when that cannot be conveniently procured, a solution of common salt in water will answer, with a small quantity of quick-lime, in the proportion of one ounce of lime to ten gallons of the water.

In this state, and immersed in this solution, the materials are to be boiled for a considerable length of time, filling up the vessel with a further supply of water as it evaporates: the time of continuing the operation being dependent upon the quality and condition of the material, which can only be known by observation; and afterward, the fibres having been washed free from the salt, they are to be dried, and will be then fit for the heckling.

It is to be observed, that where the premises and other circumstances will allow, submitting the fibrous material to the action of steam in a close vessel would answer the purpose even better than the boiling water; but in that case, salt is to be spread between the layers with the potash or other materials.—[*Inrolled in the Petty Bag Office, November*, 1833.]

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*To* WILLIAM STEDMAN GILLETT, *of Guildford-street, in the county of Middlesex, Esq., for his invention of certain improvements in guns and other small arms.* —[Sealed 8th February, 1834.]

THE Patentee commences his specification by observing that, according to the ordinary construction of

fowling-pieces, muskets, rifles, pistols, and other small arms, the right hand, which holds and fires the piece, is placed (with the exception of the fore-finger, which pulls the trigger,) behind the breech; it follows, of consequence, that when the barrel is long and heavy, it becomes desirable to increase the weight of the stock, in order to bring the centre of gravity of the piece as near as possible to the place where the hand holds it, in order to assist, as much as may be, the power of the hand, in raising the gun to the point of direction, required.

"When the stock is not weighted at the butt part, for the purpose of bringing the centre of gravity to the point where the firing hand holds it, the weight of the barrel, particularly in a heavy gun or pistol, requires considerable exertion to support it in the act of presenting.

"Now, the object of my invention is, to construct or mount the barrels of rifles, muskets, fowling-pieces, and other such like guns and small arms, in such a manner, that the right hand, which holds and also fires the gun or other small arms, may be placed considerably forward from the breech, and approach as nearly as possible to the centre of gravity of the barrel; the butt of the gun projecting only a short distance from the end of the barrel, and, consequently, not materially operating to vary the centre of gravity of the whole, from the centre of gravity of the barrel itself.

"By these means, I am enabled to produce guns and other small arms, having a given length and strength of barrels, much lighter and more convenient to be handled, than when mounted in the ordinary manner; and, at the same time, a gun or other small arm, when mounted or stocked according to my invention, will,

for a given length of barrel, be much shorter than when mounted or stocked as heretofore; and by this means a gun of greater power, though but of equal weight with an ordinary fowling-piece, musket, or rifle, may be fired with much greater facility, at the same time it may be held with more firmness and steadiness; whilst any oscillation caused by a slight involuntary movement of the hands, arm, or body (owing to the holding being considerably along the barrel), will not so materially effect the pointing, as when the hand, which holds and fires, is placed at a greater distance from the muzzle of the gun—that is, at or behind the breech, as heretofore practised.

"Secondly, my invention consists in applying a spring for the purpose of permitting a longitudinal movement to the barrel; and in order that these my inventions may be fully understood, I have appended explanatory drawings.

"Plate VI. fig. 11, represents the outline of an ordinary gun or fowling-piece, which I have shown as a matter of comparison, in order the more clearly to point out the object of my invention; *a*, is the small of the butt, or part at which the hand which fires grasps the stock, whilst the other hand is carried forward as a rest for the barrel.

"Fig. 12, represents a gun mounted or stocked, according to my improvement. In this figure, it will be seen that there is a projecting handle *b*, considerably forward of the breech, which is intended to be as nearly as possible under the centre of gravity of the barrel. This handle is grasped by the hand which fires the gun, the trigger being in front of the handle.

"There is a connecting rod attached to the trigger, shown by dots, which connects the lock and trigger together. The lock may be of any ordinary construc-

tion; but in this instance its action is reversed, the cock striking in an opposite direction to that which is usual, and this is done with the view of allowing the barrel to have a movement lengthwise.

"There is a coiled spring *c*, contained in the socket *d*, into which the breech end of the barrel is intended to enter, and slides when there is a strong recoil; the slits, through which the pins *e*, pass, allowing of such a movement; but I only recommend such an application of a spring to guns firing ball, as muskets and rifles.

"I have not thought it necessary to show a figure of a musket or rifle, as the manner of stocking or mounting such fire-arms, according to my invention, will be readily understood by any workman; nor have I thought it necessary to show a figure of the mounting of a pistol stocked, according to my invention. I would therefore remark, that in this instance there would be no butt, as in ordinary pistols, the stock proceeding only to the breech of the pistol, the holding part or handle being formed at or near the centre of gravity of the barrel, in like manner to the guns above described.

"Having now described the nature of my invention, and the manner of carrying the same into effect, I would have it understood that I lay no claim to any of the parts of a gun or pistol which are well-known and in use; but what I claim as my invention, is the mounting or stocking of guns, or other small arms, in such manner, that the hand which fires, holds, and supports the gun at or near the centre of gravity of the barrel, and consequently considerably forward of the breech. Secondly, I claim the application of a spring, as above described, for the purpose of allowing a longitudinal movement to the barrel.—[*Inrolled in the Inrolment Office, August*, 1834.]

Specification drawn by the Patentee.

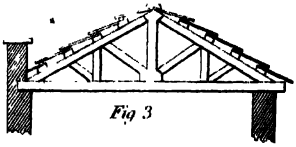


Fig 3



Fig. 4

## Wirths Impd Roofing

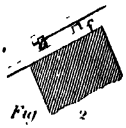


Fig 2

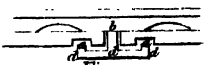


Fig. 1.

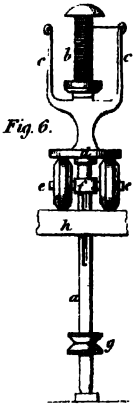


Fig. 6.

## Warren's Brick Machinery

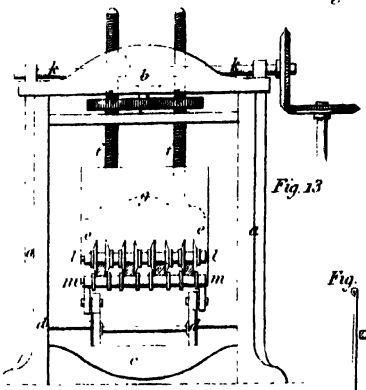


Fig. 13

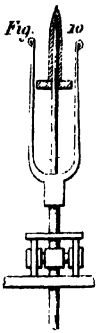


Fig. 10

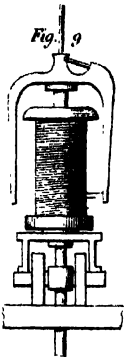


Fig. 9

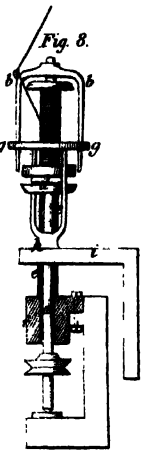


Fig. 8.

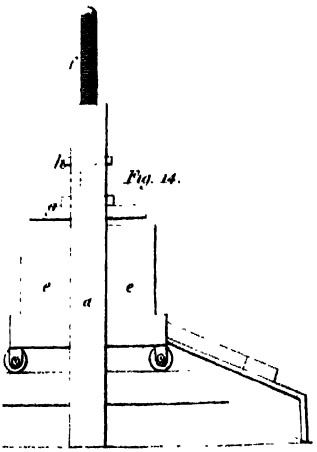


Fig. 14.

*To* JAMES JONES, *of Salford, within the parish of Manchester, in the county palatine of Lancaster, machine-maker, for certain improvements in the making of rovings, spinning, and doubling of cotton, silk, flax, and other fibrous substances.*—[Sealed 25th May, 1833.]

THESE improvements in roving, spinning, and doubling of cotton, silk, flax, and other fibrous substances, consist in certain arrangements of machinery, by which the bobbins and the flyers are driven or made to revolve at speeds differing from each other, in order to cause the yarns, after being spun, to be taken up, that is, wound upon the bobbins with a certain tension.

Plate VI. fig. 5, represents, in a partial sectional view of a machine constructed on the principle of the throstle, the general position of the spindles, bobbins, and flyers, when mounted—their situations being nearly the same, whichever of the following contrivances are adopted.

The first feature of the improvement is a contrivance designed to drive the flyer with a speed very considerably greater than that of the bobbin; the second is a mode of driving the bobbin faster than the flyer; and the other improvements are modifications of the same principles.

Fig. 6, represents a single spindle with its flyer and other appendages: *a*, is the spindle, driven by a band from a drum passed round a whirl or pulley at its lower part; *b*, is the bobbin fixed on the top of the spindle; *c*, *c*, the flyer turning freely round the spindle; *d*, a horizontal disc-formed plate, affixed to the lower part of the flyer; *e*, *e*, are two small wheels or rollers, proposed to be made of cork, and turning vertically

upon the axles formed by studs, extending from the collar *f*, upon the peripheries of which wheels or rollers the disc plate *d*, bears.

The collar *f*, embraces the spindle, and is locked thereto by a pin passed into the groove cut in the spindle; *g*, is the whirl or pulley by which the spindle is driven; and *h*, is the ordinary copping rail of the machine.

By the rotation of the barrel or drum *i*, shown at fig. 5, the spindles *a*, are driven in the usual way, whatever number of them there may be, placed along the front of the throstle-frame, and with them the bobbins affixed to the spindles are made to revolve also. The rotary motion of the spindle *a*, causes the collar *f*, to turn, and the rollers *e*, *e*, to run round upon the flat surface of the copping rail.

The disc plate *d*, at the bottom of the flyer, bearing upon the wheels or rollers *e*, *e*, is made to turn round the spindle by the friction of the peripheries of the wheels against the under surface of the plate, by which means the flyers *c*, *c*, are carried round, independently of the spindle, and with a greatly increased speed.

The object of this contrivance is, that as the spindles are apt to be bent by their vibrations in the very rapid rotations given to them when spinning fine yarns or high numbers, it is considered that this arrangement will cause the flyers to run so far before the spindles, as to give the required twist to the yarns, however fine, or high their numbers, without the spindles turning at that very great velocity which has been hitherto found necessary in spinning such yarns.

The other mode of effecting this object is, by the construction shown at fig. 7, where a single spindle is represented detached from the machine, and in which the

spindle and flyer turn together; but the bobbin is prevented from revolving with the spindle by a tension cord passed round a pulley upon which the bobbin has its bearing.

The spindle *a*, turns in a step in the bottom rail *b*, of the machine, and passes up through the bearing rail *c*, and through the copping rail *d*. A pulley *e*, is put loosely upon the spindle; and the bobbin *f*, which is likewise loosely upon the spindle, bears upon the boss or upper part of the pulley. On the top of the spindle the flyer *g*, *g*, is fixed; and the spindle with the flyer is made to revolve by a band from a drum, as in fig. 5, passed round the whirl *h*.

A tension cord *i*, *i*, made fast at one end to the copping rail *d*, is carried round the pulley *e*, and at the other end attached to a tightening screw *k*.

If the tension cord were not passed round the pulley *e*, the pulley and bobbin would be made to revolve with the spindle by the friction of the two surfaces; but the cord *i*, embracing the pulley, and being drawn by the screw *k*, tight, its tension overcomes the friction and holds the pulley, preventing it and the bobbins from revolving with the spindle.

If, however, the tension of the cord *i*, were to be relaxed by turning the screw *k*, the pulley might be so slightly retained, as to little more than overcome the friction of the spindle.

In this way it is proposed to retain the bobbin and to temper it, so as to assist the drag of the yarn in winding on when spinning very fine numbers.

Fig. 8, shows another contrivance, in which the flyer is affixed to the top of the spindle, and turns with it, while the bobbin is loose upon the spindle, and is supported by a disc on the top of a stationary tube: *a*, is

the spindle; *b*, the flyer, fixed at the upper extremity of the spindle; *c*, the bobbin, bearing upon a disc *d*, which is attached to a hollow tube *e*, made fast to the rail *f*.

The ends of the arms of the flyer *b*, pass through holes in a ring *g*, which carries the hook for conducting the yarn to be wound on to the bobbin. This ring *g*, is supported by two arms, or an under flyer, extended upwards from a boss *h*, bearing up on the copping rail *i*; and the rising and falling of the copping rail causes the ring *g*, to guide the yarn up and down the bobbin as it winds on, and thereby lay it in helical curves.

Fig. 9, is an adaptation of the first proposed plan of friction-rollers in this instance carrying round the bobbin for the purpose of producing rovings. The parts of this figure are so obvious, that the foregoing description will sufficiently explain their objects.

Fig. 10, is another modification ofthe friction rollers driving the flyer, for the purpose of spinning on to the bare spindle or on to a quill or thin tube, which is for the purpose of producing cops in a throstle frame, like those formed in the mule.

These are the various modifications of the invention; and the Patentee concludes by stating, that he claims, first,the adaptation of the rotary wheels or pulleys for giving the increased speed to the disc, which carry round the flyer or the bobbin independently of the spindle; secondly, the tension band passed round a pulley for regulating or tempering the drag of the bobbin; and thirdly, the two flyers, acting conjointly, as described.—[*Inrolled in the Inrolment Office, November*, 1833.]

*To* RALPH STEVENSON, *of Colridge, in the county of Stafford, potter, for his having invented improvements in machinery for making from clay or other suitable materials, quarries, bricks, tiles, and other materials.* —[Sealed 6th March, 1830,]

THIS appears to be rather a crude and immatured mechanical scheme for making bricks and tiles, by pressing the moist clay in a box, so as to cause it to ooze through rectangular apertures in the side of the box, and to come out in thick sheets, which sheets of soft clay, as they are delivered, are to be cut into the forms of bricks or tiles by the hands of attendants.

The machine, if such it can be called, as represented by the Patentee in the drawings, which are appended to his specification, is shown in its front elevation in Plate VI. at fig. 13, consisting of upright standards *a*, *a*, with tie beams *b*, at top, and *c*, at bottom.

Two horizontal parallel rails *d*, *d*, are affixed to the lower beam *c*, and are designed for the box *e*, which holds the clay, to be slidden in and out upon, as shown in the side elevation, fig. 14; there being rollers attached to the under part of the box, to assist in shifting its position.

Two pressing screws *f*, *f*, are passed through the upper tie beam *b*, which, at their lower extremities, support the pressing board or plunger *g*, shown by dots, as though seen through the box. To each of these screws *f*, a toothed wheel *h*, *h*, is connected, with an intermediate wheel *i*, between, by the rotation of which the screws, with the plunger or pressing board, are intended to be raised or depressed.

The pressing board or plunger having been brought

to the upper part, as in fig. 14, the box may be slidden away, for the purpose of being filled with clay; and when so filled, it is to be brought again into such a situation, as will allow the plunger to descend into the box.

As very great power is required to force down the plunger when the box is full of clay, that is to be effected by giving rotation to the transverse shaft *k*, *k*, by steam or other mechanical means; which rotation of the shaft *k*, through the bevel gear, causes the screw shafts *f*, to turn, and the plunger to be depressed in the box *e*.

It appears, from the description of the machine given in the specification, that troughs are laid in the bottom of the box *e*, leading to the discharging apertures at back and front; and that as the clay is pressed down by the force of the descending plunger, it is made to ooze through the apertures both behind and before, and to deliver itself from the several apertures in square prism-formed portions, or thin sheets, if for tiles, which are then to be cut by the hands of the workmen into the proper lengths of bricks or tiles.

In order to facilitate the discharge of the clay, a pair of rollers *l*, *l*, and *m*, *m*, are to be placed contiguous to the fronts of the apertures, as shown in the elevation, fig. 13; but how or to what these are attached we do not perceive. It is also stated, that flanges fixed upon these rollers will smooth the sides of the clay, as it passes, while the rollers themselves will level its upper and under surface.

The prism-formed portions or sheets of clay are intended to slide down the inclined plane *n*, placed in front of the discharging apertures; and as the bricks

or tiles are cut off into their desired forms, they are to be carried away to the drying ground.—[*Inrolled in the Petty Bag Office, September*, 1830.]

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*To* JOHN REVERE, *of New York, in the United States America, now residing in the parish of St. James, Westminster, M.D., for his invention of a new alloy or compound of metals, applicable to the sheathing of ships, and various other useful purposes.*—[Sealed 28th January, 1830.]

THE alloy proposed is a mixture of copper and zinc in such proportions as shall render the metals least liable to oxydation. The proportions are about five per cent. of zinc mixed with the copper when in a fluid state.

The metals in their pure state are to be weighed out and set apart in the proportions of 95lbs. of copper to 5lbs. of zinc; the copper and the zinc being fused in distinct vessels, as they will melt at different temperatures.

The copper and the zinc being melted, a small portion only of the zinc is first to be introduced into the vessel containing the fluid copper, which must be stirred up to produce a mixture of the two; and a quantity of powdered charcoal or salt is to be thrown in as a flux, to prevent the combustion of the zinc. The fluid copper may then be all turned into the vessel containing the melted zinc, and being well stirred up together with powdered charcoal or salt, as a flux, the alloy will then be fit to be cast into pigs; which pigs may be, when cold, rolled out into sheets, fit for the sheathing of ships, and for other purposes.

It is stated that the proportion of five per cent. of zinc to the copper produces the best alloy, but it would answer the purpose if the proportions were varied from two per cent. to eight per cent. of zinc to the copper; but the lesser quantity of zinc will render the copper liable to oxydation, and the greater quantity will tend to render the sheets brittle.—[*Inrolled in the Petty Bag Office, July*, 1830.]

## NOVEL INVENTION.

### IRON SHIPS.

It has long been our opinion, that the prejudice against constructing floating vessels of iron, a material, the specific gravity of which is considerably greater than that of water, would give way to the conviction that ships of that material might be made, possessing the advantageous properties of superior lightness, strength, and durability, over any that could be constructed of wood.

We have had the pleasure of examining recently a vessel building in the stocks on the Cheshire side of the Mersey, near Liverpool, the hull of which is constructed entirely of iron. She is 120 feet long, and 21 feet wide on the beam; and it is calculated that she will be capable of sustaining two hundred and eighty tons burthen. She is to be propelled by steam power, and employed in the service of the Dublin and Liverpool Steam-packet Company, at whose expense, and by whose direction she has been built.

We have subsequently learnt, that this vessel has been launched, and called the Garryowen, and that

great expectations are formed, from her manner of riding on the water, that in every respect she will be found superior to any wooden vessel afloat.

Messrs. Laird and Son, engineers, of North Birkenhead, near Liverpool, are the builders, and of whom and the superintendent engineer employed under them, too much cannot be said for the skill displayed in the plan and execution of this great work, the largest vessel that has ever been attempted to be constructed of metal.

She went off the stocks in fine style, receiving her name from the lady of C. W. Williams, Esq. She is intended to navigate the Lower Shannon from Limerick to the sea.

To the enterprising spirit of C. W. Williams, Esq., the managing director of the company, may be attributed the great extension of this novel feature in naval architecture; and we have no doubt that every day's experience will tend to show that his partiality for iron vessels has been well founded, and that by their means we shall be enabled to improve the inland navigation of Ireland.

The Garryowen is well worthy inspection, from the beauty of her model, the peculiarity of her construction, and the precautions that have been taken to prevent any risk of accident. From an examination of her build, it would appear that ships may be constructed of iron of any degree of strength, and equal in every respect to those built of wood.

She is fitted with four water-tight bulk-heads, which divide her into five compartments; the advantage of which is, that, should any of these be injured by striking on a rock, or otherwise, there will be buoyancy sufficient in the four to float the vessel safely.

Messrs. Laird and Son have, during the last twelve

months, completed two smaller iron steamers, on the same principle as the Garryowen: one of them is at Savannah, the other on Loch Derg, Ireland. They are now, we hear, building two large ones for the Euphrates, for the purpose of conveying the mail to and from Bombay.

There are many advantages connected with the construction of vessels of iron instead of wood; among which may be enumerated the facility of repairing any accident arising from external violence, by carrying in the vessel a quantity of iron plates properly shaped and pierced with holes, and rivet bolts, ready to be employed immediately on any emergency.

There is also another point of great importance in connexion with iron vessels—they may be made with air-chambers in all the vacant parts, which would prevent the possibility of the vessel sinking, even if she were filled with water up to her gunwale edge. And the danger of being destroyed by fire at sea, is by the incombustibility of the material completely removed.

## CHEMISTRY APPLIED TO THE ARTS.

M. Dubuc, senior, of Rouen, has applied himself with success to the detection of farinaceous mixtures in wheaten flour. The principal substances with which flour is adulterated is potato starch, a fecula; beans, barley, chalk, plaster of Paris, &c. An extract from his memoir is published in the last Bulletin of the Society of Encouragement, from which the following is taken:—

There are two methods of detecting adulterated flour—mechanical and chemical. In France, the adulteration is principally with potato starch, as it renders the bread whiter and heavier.

If there be more than ten per cent. of potato starch, it may be detected by the naked eye, or with the aid of a magnifying glass; the fecula is whiter, the particles are angular, and reflect the rays of light like minute crystals. To render the discovery more easy, M. Dubuc dries the suspected flour in a sand bath, at 100 to 110 of Fahrenheit; and then, with a good magnifying glass, so small an adulteration as five per cent. may easily be detected.

But if the miller has been cunning enough to grind the potato starch with the wheat, other means of detection must be had recourse to.

The first is, from the great difference between the specific gravities of wheat, flour, and potato starch.

The second is, that flour contains a certain per centage of *gluten*, and the starch does not contain an atom of gluten.

*First Method.*—A vessel that will contain one pound of flour, gently pressed down, will contain a pound and a half of *fecula*; from these data the relative proportions of flour and fecula in any parcel of flour may be easily ascertained, very near the truth.

*Second Method.*—The best flour contains about twenty per cent. of gluten, and, as we have stated, the starch not an atom.

*Experiment.*—Take five ounces of pure wheat flour and two ounces and a half of warm water, mix and work it well for about ten minutes, the paste will be firm and elastic. Let a little warm water fall continually upon it while you continue to knead it. By this means all the starch and saccharine mucilage will be extracted. The operation is finished when the water flowing from it ceases to be white; what remains is gluten, the weight of which will be about one ounce. If the flour be adulterated, the paste will be more liquid, less cohesive, and less elastic: and an intelligent baker will soon be able to discover to what extent the flour has been adulterated, from the appearance of the paste, &c.

Such are the mechanical means that may be employed with success.

*Employment of Chemical Agents to discover Frauds in Flour.*—It will be well to bear in mind that wheat flour is an animalised azotic matter *(matière animalisé azoteé)*, and that, on the contrary, fecula, or the starch extracted, pure from cereals, are entirely of a vegetable nature; from this difference, results the varied effects of the re-agents employed.

The three chemical texts which have been found best for general use, are nitric and muriatic acid, and the liquid nitrate of mercury *(dento nitrate)*. Their chemical effects on flour and fecula are as follows :—

1st. Nitric acid has the property of colouring wheat flour of a fine orange yellow, whereas it neither affects the colour of fecula nor starch.

2d. Pure muriatic acid colours good wheat flour of a deep violet, but dissolves fecula and starch, and forms with it a light, colourless, viscous fluid, decomposable by alkalis.

*Experiments with Nitric Acid of* 40.—Take 100 grains of pure wheat flour, pour on it 100 grains of nitric acid (aquafortis) in a small earthern or china cup, stirring it with a glass tube, it will heat a little, and in a few hours it will change colour, from yellow to a fine orange colour.

Take 100 grains of fecula, and pour on it 100 grains of nitric acid; heat it in every respect the same as above, but no caloric will be evolved, and the mixture will not change colour.

Take flour 80 grains and fecula 20 grains, and acid 100 grains; mix well. the colour will now be much paler, and of a light citron colour. Take 50 grains of flour, and 50 grains of fecula, and 100 grains of acid; mix well: the colour is now much paler than before; so that, with a little practice, the quantity of fecula may be detected by the greater or less intensity of colours.

*Experiments with Muriatic Acid of* 21 *degrees of strength.*—Take of wheat flour and acid each 100 grains; mix well: the colour will become at first red, then violet, and finish by becoming of a beautiful indigo colour. This operation is accelerated, if a gentle heat be applied.

Take 100 grains of fecula and 100 grains of acid, the mixture is at first of the consistence of paste, and then becomes liquid; the fecula is dissolved, and the solution *colourless.*

On varying the proportions of flour and fecula, we shall soon be able to ascertain the quantity of fecula in a sample of suspected flour.

*Experiment in the liquid Nitrate of Mercury.*—Take of flour and nitrate, each 100 grains; mix well with a glass tube or rod. The paste will at first be of a pale citron, then reddish, and in three hours will become a full red. The colour is permanent.

Take 100 grains each of fecula and nitrate, they will not combine, nor will the colour of the fecula or starch be acted upon.

By mixing flour and fecula in different proportions, and observing the colours, we may soon be able to detect the proportions in which flour is adulterated by fecula or starch.

It may also be observed, that fecula absorbs less water than flour, which affords a ready means of detection.

The adulteration with bean or pea flour may be detected by pouring boiling water upon it, which developes the peculiar smell of these two substances.

We may add, that the adulteration with chalk or gypsum may be detected by pouring a diluted acid on the suspected flour, as an effervescence will take place, and carbonic acid gas be disengaged.

## LITERARY NOTICE.

*An Essay on the Nature and Application of Steam, with an Historical Notice of the Rise and Progressive Improvements of the Steam Engine.* By M. A. Alderson. London: Sherwood, Gilbert, and Piper.

Without any great pretensions, being the maiden production of a mere mechanic, this little essay ought to raise a blush on the

check of some of those writers who have incumbered our shelves with ponderous quarto volumes, on the same subject, which would be perfectly despicable were it not for the talent displayed by their graphic illustrators.

We have here an octavo of only one hundred and twenty-four pages, with eighteen well-executed plates, beside wood-cuts, which give as fair and popular an account of the rise and progress of the application of steam to manufacturing purposes, as is to be found in any work of more imposing appearance.

The style in which this essay is written is concise, and for the most part clear: much cannot be said, or indeed expected, of it, in a literary point of view; but books on these subjects are not designed for the exhibition of literary excellence, and seldom pass under the ordeal of severe criticism.

As a stimulus to the promotion of practical knowledge in the Mechanics' Arts, the President of the London Mechanics' Institution offered a reward for the BEST ESSAY ON STEAM: and on a comparison with several others (all, it is said, possessing considerable merit), the essay before us was adjudged to carry away the palm.

We are not prepared to go the length of eulogising this essay in the way in which it has been publicly spoken of by Drs. Birkbeck and Lardner; nor, on the other hand, can we countenance the wholesale condemnation and abuse which we hear has been heaped upon it by some of the periodicals, who view the merits of books through that *infallible* medium, the name of their publisher.

Without, therefore, intending to bestow any very high encomium upon the production, we have no hesitation in saying, that most of our readers will be much pleased with it on perusal.

## AMERICAN PATENTS.

*(From the Franklin Journal.)*

For a Machine for *Hulling and Cleaning Clover*; Elisha Rider, Livingstone, Nelson county, Virginia.

A main cylinder covered with wire cards, is to be in great part surrounded by a hollow cylinder of perforated sheet iron. The seed to be hulled is carried between these by a revolving apron, and is to pass down an inclined board to a fan wheel. In the circuit of the seed, as it is acted upon by the main cylinder, it passes also between it and smaller cylinders, covered with cards, operating like the fancy cards of a carding machine. The claim is to the peculiar arrangement of the several parts of the machine.

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For Machinery for *Spooling Cotton Roving;* William H. Elliot, Leicester, Worcester county, Massachusetts.

The apparatus here patented is denominated the *double revolving speeder*, to distinguish it from the double speeder, for which it is intended to be substituted, as producing a like advantage at a diminished expense In this machine the spool has two motions, by one of which motions it is to twist the roving, and by the other to wind it upon itself when so twisted.

The spool is contained in a frame attached to a vertical revolving shaft, by the revolution of which, the twist above spoken of, is put into the roving. The apparatus for distributing the roving equally upon the spool, and producing the other motions required, cannot be explained without the drawing; from its apparent complexity, we should not suppose that it would attain the main object, that of diminishing the cost; the in-

ventor, however, ought to be able to judge of this. He says, "all I claim of my invention is the double revolving motion of the spool."

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For an improvement in *Stoves;* Jordan L. Mott, city of New York, December.

The claim made under this patent is to the "combining the open Franklin with the close stove, by connecting the grate, which is thrown back, by a plate, or plates, with the close part of the stove; the one stove being thus placed, as it were, above, or higher than the other."

The lower portion of this stove is to be in the form of the open, or Franklin stove, and is to contain a grate for fuel; the plates forming the exterior of it are to be continued up to any convenient height, and this upper part constitutes the close stove. There may be a pipe from the top plate to carry off the smoke; and it is proposed to divide the close part into two compartments, by a soap stone partition, descending from the top plate, to a considerable distance down; the anthracite may be put through an opening in the top plate over the front division, and it will then fall into the grate; the front plate being curved inwards, so as to conduct the coals over the upper bar; this constitutes the principal novelty, and is the foundation of the claim.

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For *Bedstead Fastenings;* George Porter, Cincinnati, Ohio.

The fastenings described, like many which have preceded them, operate on the principle of the wedge, but in their form and mode of application they appear to possess novelty. All, however, that we shall do as

regards this patent, is to give the claim, which is to "the particular construction of the corner iron upon the post, its length being sufficient to embrace the whole thickness of the rail; with the form of the wedges, they being slightly curved, bring the bearings in the centre, thus rendering them less liable to break, and offering other advantages in the construction; the form and manner of inserting the irons in the rails, and the general arrangement of the whole for the attainment of the ends proposed."

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For an improvement in *Bricks, and the Machinery for making them;* Thomas A. Sherman, Scriba, Oswego county, New York.

The title of this patent, as given in the petition, is, "an improvement in the composition of mortar for making bricks, water-proof and fire-proof; and also machines for mixing the mortar, for brick, and also a machine for moulding brick."

In mixing the materials, half a bushel of unslacked lime, and half a bushel of salt are to be added to every barrel of water employed; and this, we are told, will make brick which will stand in fire and in water.

The grinding machine is a circular trough to contain the mortar, and within this is a roller consisting of six or more wheels revolving upon a shaft drawn round by a horse, and having its inner end properly attached to a vertical shaft. The wheels are to diminish in diameter as they approach the centre, and each of them is to be covered with a hoop or tire of iron. These wheels are placed a small distance apart, and iron scrapers, fixed upon bars, pass in between each of them, to scrape out the mortar. At each of these spaces other pieces of iron, like the coulter of a plough,

descend down into the mortar, to cut and divide it as the wheels go round. The machine for moulding, consists of a table or platform, along which a carriage is to be drawn towards either end, by means of a crank, from the shaft of which ropes pass over pulleys. The carriage is to contain a mould for eight bricks, and when this mould is at the middle of the table, it stands between cheeks which rise a few inches above it, and form two sides of a hopper to receive the mortar; whilst two lids, each of which when down covers half the mould, form, when raised, the ends of the hopper: into this, clay enough is to be thrown to make the bricks, and on shutting the lids down, it will be squeezed into the moulds; these being drawn forward, the lids operate as a strike; the mould is then to be removed, and a new one applied.

The inventor says—"I claim to have discovered the composition above described for making brick, and to be the inventor of the two machines above described."

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For an improvement in *Butt Hinges for Tables;* Humphrey Treadwell, Hyde Park, Dutchess county, New York.

This is not properly a butt, but a table joint hinge; it is intended as a substitute for the rule joint of dining, breakfast, and other tables, and is so made as to extend along the whole length of the leaf, and to show a quarter round of metal instead of wood. Its form may be readily conceived by supposing the half of a butt hinge to have the wire tube extended from end to end, without being divided into separate knuckles, and that there were as many of these half hinges as would extend along the whole joint; the leaf and bed of the

table are then to be rebated and hollowed so as to receive the strap of the hinge, and one half of the barrel or tube; when this has been properly done, on screwing the half hinges alternately on the bed and the leaf, so as to form close joints, this part of the work will be finished, and the leaf, when down, will show a small, continuous, quarter round of metal.

It is proposed to make these hinges of sheet brass, by bending the separate pieces over a wire, in which case the strap part will be double; and this, probably, will be the best way of forming them; the Patentee, however, does not confine himself to this method, but claims the general construction of such hinges, whether made of cast or of sheet metal.

We think the plan a good one, as the appearance of the joint will be neat, whilst its strength will be much greater than when made in the old way. It will be somewhat, but probably not much more costly.

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For an improvement in *Rail-road Cars;* Abel Look, Waterford, Saratoga county, New York.

This device consists in making each wheel fast to a separate axle, the inner end running in bearings under the centre of the car, and the outer end in the frame work, outside of the wheel. The object is said to be, the enabling the car to run with facility upon a curved as well as on a straight road. In speaking of this mode of construction, the Patentee says, "I am aware that in rail-road cars the axles have been so made as to allow one wheel to turn thereon, whilst the other was made fast, the axle being allowed to revolve; I am also aware that it has been proposed to make the wheels of common carriages or waggons, each fast to its own axle, the axles turning in suitable bearings; but the

adaptation of wheels, each fastened to its own axle, to rail-road cars, in the manner and for the purposes herein described, I claim as new, and as my own invention; and it is for this specifically that I ask a patent.

We do not perceive any difference in the effect to be produced by this plan, and that which results from the allowing of one wheel to be loose on the axle; it may also be doubted whether there is enough of novelty to sustain a claim to a patent in the mere adoption of a known method of fixing wheels, in the construction of rail-road cars.

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For an improvement in *Coach Steps*; Charles M. King, Newark, Essex county, New Jersey.

The joints of coach steps, as usually constructed, depend for their strength upon a single projection across the end of each side piece; and as the force to which they are subjected is frequently very considerable, this is apt to give way. The Patentee makes his steps with a double bearing. In addition to that across the back ends of the horizontal side pieces of the upper step, which rest against the back ends of the perpendicular pieces to which they are attached, he makes strong projections from the back edges of the perpendicular parts, to receive the upper ends of the projections on the horizontal pieces: a step thus made cannot give way, unless both bearings should break at the same time. The middle and lower joints are constructed upon the same principle.

These projections constitute the only difference between these and other coach steps, and comprise the whole claim.

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# New Patents

## SEALED IN ENGLAND,

## 1834.

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To John Beard, of the parish of Leonard Stanley, in the county of Gloucester, for his invention of certain improvements in machinery for dressing woollen cloth. —Sealed 1st September – 6 months for inrolment.

To George Joseph Green, John Ogden Bacchus, and William Gammon, of Birmingham, in the county of Warwick, glass-manufacturers, for improvements in the manufacture and working of plate and other glass, being a communication from a foreigner residing abroad. —Sealed 1st September—6 months for inrolment.

To John Chanter, of Stamford-street, in the county of Surrey, and of Earl-street, Blackfriars, in the city of London, gentleman, for his invention of an improvement in furnaces.—Sealed 2d September—6 months for inrolment.

To John Joseph Charles Sheridan, of Walworth, in the county of Surrey, chemist, for his invention of certain improvements in the several processes of saccharine vinous and acetous fermentation.—Sealed 6th September—6 months for inrolment.

To William Longfield, of Otley, in the county of York, whitesmith, for his invention of an improved lock or fastening for doors, and other situations where security is required.—Sealed 6th September—6 months for inrolment.

To Henry Shrapnel, of Salisbury, in the county of Wilts, major-general and colonel in the Royal Artillery, for his invention of improvements in fire-arms of various descriptions, and in ammunition for the purposes of fire-arms.—Sealed 6th September—6 months for inrolment.

To Miles Berry, of Chancery-lane, in the parish of St. Andrew, Holborn, in the county of Middlesex, civil engineer, for certain improvements in mills for grinding wheat and other grain, and which improvements render them also applicable to other purposes; being a communication from a foreigner residing abroad. —Sealed 13th September—6 months for inrolment.

To Stephen Perry, of Wilmington-street, Wilmington-square, gentleman; Edward Massey, senior, of King-street, Clerkenwell, watch-manufacturer; and Paul Joseph Gauci, of North-crescent, Bedford-square, artist, all in the county of Middlesex, for their invention of certain improvements in pens and pen-holders.—Sealed 20th September—6 months for inrolment.

To Edward Weeks, of King's-road, Chelsea, in the county of Middlesex, horticultural builder, for his invention of certain improvements on kitchen or other grates, or ranges which he denominates Weeks's cooking apparatus.—Sealed 20th September—6 months for inrolment.

## CELESTIAL PHENOMENA, FOR OCTOBER, 1834.

D. H. M.

1 Clock after the ☉ 10 m. 15 s.
— ☽ passes the mer. 23 h. 32 m.
9 16 ♃'s first sat. will im.
15 5 ♃'s second sat. will im.
2 3 46 ☿ in the descending node.
11 2 Ecliptic conj. or ● new moon.
15 40 ♄ in conj. with the ☽ diff. of dec. 2. 39. S.
21 ☽ in Perigee.
Mer. R. A. 13 h. 20 m. dec. 8. 33. S.
Ven. R. A. 15 h. 33 m. dec. 22. 22. S.
Mars R. A. 6 h. 33 m. dec. 23. 34. N.
Vesta R. A. 4 h. 20 m. dec. 13. 6. N.
Juno R. A. 19 h. 12 m. dec. 12. 29. S.
Pallas R. A. 13 h. 26 m. dec. 5. 13. N.
Ceres R. A. 13 h. 25 m. dec. 2. 1. S.
Jup. R. A. 4 h. 41 m. dec. 21 19. N.
Sat. R. A. 12 h. 52 m. dec. 3. 11. S.
Georg. R. A. 21 h. 42 m. dec. 14. 34. S.
☿ passes the mer. 0 h. 33 m.
♀ passes the mer. 2 h. 46 m.
♂ passes the mer. 17 h. 45 m.
♃ passes the mer. 15 h. 52 m.
4 10 ☿ in conj. with the ☽ diff. of dec. 1. 50. S.
♂ in conj. with ε in Geminor, diff. of dec. 1. 43. N.
5 Clock after the ☉ 11 m. 28 s.
— ☽ passes the mer. 2 h. 15 m.
16 ♀ in conj. with the ☽ diff. of dec. 5. 29. S
6 16 ♃'s first sat. will im.
Occul. β Ophiuchi, im. 5 h. 40 m. em. 6 h. 53 m.
♄ in conj. with the ☉.
♀ in conj. with δ in Scorpii, diff. of dec. 1. 28. N.
Occul. λ Sagitt. im. 6 h. 52 m. em. 7 h. 35 m.
11 10 ♃'s first sat. will im.
9 4 ☽ in □ or first quarter.
10 Clock after the ☉ 12 m. 52 s.
— ☽ passes the mer. 6 h. 58 m.
11 10 29 ☿ greatest elong. 46. 51. E.
23 46 ♅ in conj. with the ☽ diff. of dec. 3. 56. N.
12 ♀ in conj. with σ in Scorpii, diff. of dec. 0. 20. S.
♃'s second sat. will im.
☿ in Aphelion.
36 ♃'s first sat. will im.
♀ in conj. with α in Scorpii, diff. of dec. 0. 46. S.
15 Clock after the ☉ 14 m. 5 s.
- ☽ passes the mer. 10 h. 44 m.
4 ♃'s first sat. will im.
16 ☽ in Apogee.
17 3 ☿ greatest Hel. Lat. S.
26 Ecliptic oppo. or ○ full moon.
33 ♃'s first sat. will im.
20 Clock after the ☉ 15 m. 4 s.
- ☽ passes the mer. 14 h. 14 m.
21 3 6 ♃ in conj. with the ☽ diff. of dec 0. 14. S.
22 29 ♃'s first sat. will im.
♄ in conj. with θ in Virginis, diff. of dec. 0. 32. S.
23 23 ♂ in conj. with δ in Geminor, diff. of dec. 1. 10. S.
4 ♂ in conj. with the ☽ diff. of dec. 1. 25. S.
- Mer. R. A. 15 h. 11 m. dec. 20. 11. S.
- Ven. R. A. 16 h. 56 m. dec. 26. 52. S.
- Mars R. A. 7 h. 9 m. dec. 23. 27. N.
- Vesta R. A. 4 h. 14 m. dec. 13. 6. N.
- Juno R. A. 19 h. 29 m. dec. 13. 43. S.
- Pallas R. A. 14 h. 1 m. dec. 3. 40. N.
- Ceres R. A. 13 h. 58 m. dec. 5. 35. S.
- Jup. R. A. 4 h. 37 m. dec. 21. 12. N.
- Sat. R. A. 13 h. 1 m. dec. 4. 7. S.
- Georg. R. A. 21 h. 41 m. dec. 14. 40. S.
- ☿ passes the mer. 1 h. 6 m.
- ♀ passes the mer. 2 h. 50 m.
- ♂ passes the mer. 17 h. 1 m.
- ♃ passes the mer. 14 h. 29 m.
24 9 27 ♃'s first sat. will im.
Clock after the ☉ 15 m. 47 s.
☽ passes the mer. 18 h. 36 m.
28 ☾ in □ or last quarter.
☿ in conj. with A in Oph. diff. of dec. 0. 49. N.
12 14 ♃'s second sat. will im.
Occul. ν Virginis, im. 16 h. 25. m. em. 17. h. 22 m.
30 Clock after the ☉ 16 m. 11 s.
— ☽ passes the mer. 23 h. 2 m.
8 13 ♄ in conj. with the ☽ diff. of dec. 2. 31. S.
31 9 ☽ in Perigee.
20 7 Ecliptic conj. or ● new moon.

J LEWTHWAITE, Rotherhithe.

# METEOROLOGICAL JOURNAL,

## FOR AUGUST AND SEPTEMBER, 1834.

| 1834. | Thermo. | | Barometer. | | Rain in inches. | 1834. | Thermo. | | Barometer. | | Rain in inches. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hig. | Low. | High. | Low. | | | Hig. | Low. | High. | Low. | |
| Aug. | | | | | | Sept. | | | | | |
| 26 | 63 | 40 | 29,63 | 29,61 | ,075 | 11 | 59 | 51 | 29,82 | 29,71 | ,05 |
| 27 | 64 | 45 | 29,72 | 29,65 | ,175 | 12 | 65 | 50 | 30,13 | 29,99 | ,15 |
| 28 | 64 | 46 | 29,77 | 29,70 | | 13 | 66 | 41 | 30,24 | 30,17 | |
| 29 | 65 | 47 | 29,64 | 29,60 | ,15 | 14 | 67 | 40 | 30,29 | 30,28 | |
| 30 | 67 | 49 | 29,59 | 29,55 | ,4 | 15 | 67 | 39 | 30,25 | 30,21 | |
| 31 | 68 | 49 | 29,73 | 29,67 | ,125 | 16 | 68 | 40 | 30,14 | 30,04 | |
| Sept. | | | | | | 17 | 71 | 39 | 29,91 | 29,89 | |
| 1 | 66 | 51 | 29,83 | 29,79 | ,225 | 18 | 73 | 43 | 30,21 | 30,05 | |
| 2 | 67 | 54 | 29,93 | 29,88 | ,15 | 19 | 73 | 45 | 30,28 | 30,27 | |
| 3 | 65 | 51 | 29,99 | 29,97 | ,075 | 20 | 75 | 48 | 30,26 | 30,24 | |
| 4 | 66 | 52 | 30,05 | 30,03 | ,025 | 21 | 70 | 45 | 30,22 | 30,11 | |
| 5 | 70 | 47 | 29,99 | 29,97 | | 22 | 67 | 55 | 30,19 | 30,21 | |
| 6 | 69 | 53 | 30,07 | 30,00 | | 23 | 61 | 45 | 30,13 | 30,12 | |
| 7 | 67 | 49 | 29,99 | 29,92 | ,05 | 24 | 62 | 42 | 30,11 | 30,09 | |
| 8 | 65 | 48 | 29,70 | 29,56 | ,1 | 25 | 63 | 41 | 30,09 | Staty. | |
| 9 | 64 | 44 | 29,41 | 29,37 | ,15 | | | | | | |
| 10 | 63 | 49 | 29,72 | 29,66 | ,125 | | | | | | |

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

*To* JOHN COWDEROY, *of Britannia-street, City-road, in the county of Middlesex, gentleman, for his having invented certain improvements in machinery for making bricks.*—[Sealed 2d November, 1829.]

THE general construction of this brick-making machinery resembles in its leading features most of the other machines which have been projected for the same purpose, but the present has some peculiar parts designed for particular objects, which we shall presently describe.

The machine or engine consists of substantial side frames or standards of cast iron, in which are mounted the axles of transverse rollers carrying an endless chain, whereon a series of moulds are mounted, in which the clay is to be pressed for forming the bricks.

This endless chain, as the rotation of the rollers carries it forward, slides upon a flat table firmly secured to the framework, the table constituting the resisting surface against which the force is exerted in pressing the earth into the moulds.

Above the series of travelling moulds, a box or hopper is placed containing the brick earth, supplied thereto from a barrow occasionally, which falls down into the moulds as they move onward, and, in their progress, passing under an inclined surface, the clay or brick earth becomes pressed firmly into the moulds, and is made smooth on their upper surfaces by a horizontal scraper.

As the moulds travelling with the endless chain arrive successively at that part of the machine where they pass down over the roller, the bricks are intended to drop out of their respective moulds on to an endless band, or creeping cloth extended over a pair of rollers, which creeping cloth is made to move progressively forward by gear, or

other suitable connexion, with the moving part of the engine; and from this creeping cloth the bricks are successively taken by boys, and carried to the drying ground.

The above shows the general construction and movements of the machine or engine for making bricks; the following are the particular features of improvement.

As there has always been found considerable difficulty, from the adhesive nature of the clay, of discharging the bricks from the moulds, it is proposed that each mould shall be formed of several pieces jointed together, which pieces are confined and held tight while the clay is pressed into the moulds, but are made to open when the moulded brick is to be discharged. The ends of the moulds therefore are formed by pieces standing up perpendicularly from the joints of the chain, and the sides of the moulds by pieces connected to the long links of the chain by hinges.

When the moulds are passing along the horizontal table under the clay trough, the parts of the moulds are confined and held firmly together, but when they arrive respectively at that part where the chain passes down over the roller the ends of the moulds open radially, and the side pieces of the moulds fall back on their hinges. The new-moulded bricks are by these means released from their adhesion to the sides and ends of the moulds, and at the same time a small plunger in the bottom of each mould rising up, pushes the brick from its seat, and causes it to fall down on to the creeping cloth, as before described.

As it is necessary, in order to carry away the soft new-moulded bricks without injuring their form, to deposit each of the bricks as they fall from the mould upon a small square board, a considerable number of these square boards are placed one upon another in an upright trough, from which they are to descend one at a time through the

bottom on to the endless band or creeping cloth, into suitable situations for receiving the bricks as they fall from the moulds.

For the purpose, therefore, of delivering these boards singly and with regularity on to the creeping cloth, a square block is made to revolve under the trough which has a spring upon each of its four sides. These springs, as the block goes round, each take hold of a board as it descends and conduct it to an inclined plane, upon which the boards respectively slide down on to the creeping cloth. In this manner the boards are all regularly ranged upon the creeping cloth, ready, as the cloth moves on, to receive the bricks successively falling from the moulds.

For the purpose of clearing the moulds from any portions of clay which may adhere to them, an apparatus is placed beneath the machine, by which water is thrown up against the interior of the moulds as they pass along after discharging the brick, and by which the moulds are wiped out.

This apparatus consists of, first, a spring scoop placed in a vessel of water under the travelling moulds, against the outer end of which scoop a tappet wheel acts. As this tappet wheel goes round, the end of the spring scoop is occasionally depressed, and then being suddenly let go, a portion of water is by the recoil of the scoop thrown upwards into the moulds. Immediately behind this a wheel carrying a series of sponges is kept in constant rotation; which sponges, as the wheel revolves, wipe the interior of the moulds clean from any clay that may have attached itself to their interiors.

After each successive mould has proceeded beyond the washing and cleansing apparatus just described, a similar spring scoop is adapted for the purpose of throwing up dry sand from a sand box below against the moulds as they

pass; which sand is intended to attach itself to the interior of the moulds for the purpose of preventing the adhesion of the clay thereto, when the moulds again pass under the hopper, and become charged with the material in continuing the operation of moulding the series of bricks in the way first described.—[*Inrolled in the Petty Bag Office, May,* 1830.]

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Here ends the Reports of all the Specifications of Patents for Inventions, granted previously to the year 1830.

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The whole number of Patents for Inventions granted in England from the beginning of the year 1820 to 1830, amounted to *one thousand four hundred and forty-one;* and of these, from accident, or other causes, known only to the Patentees, the Specifications of seventy-one have not been inrolled in Chancery, as directed in each grant; consequently, no accounts of those inventions can be given. The Patent rights, in those instances, have become null and void.

The following are the numbers of Patents granted in the several years :—

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1820 | granted | - | 95 | Specifications not inrolled | | | | 7 |
| 1821 | - | - | 115 | - | - | - | - | 5 |
| 1822 | - | - | 106 | - | - | - | - | 4 |
| 1823 | - | - | 136 | - | - | - | - | 2 |
| 1824 | - | - | 179 | - | - | - | - | 8 |
| 1825 | - | - | 247 | - | - | - | - | 15 |
| 1826 | - | - | 131 | - | - | - | - | 7 |
| 1827 | - | - | 150 | - | - | - | - | 6 |
| 1828 | - | - | 152 | - | - | - | - | 6 |
| 1829 | - | - | 130 | - | - | - | - | 11 |

Cunningham and Salmon, Printers, Crown-court, Fleet-street.

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## JOURNAL OF ARTS AND SCIENCES,

AND

## REPERTORY

OF

# PATENT INVENTIONS.

*CONJOINED SERIES.*

No. XXXI.

## Recent Patents.

*To* LEMUEL WELLMAN WRIGHT, *late of the London-road, in the parish of St. George, Southwark, in the county of Surrey, but now of Sloane-terrace, in the parish of St. Luke, Chelsea, and county of Middlesex, engineer, for his having invented a certain improvement or certain improvements in the combination and arrangement of machinery or apparatus, whereby certain well-known agents may be employed in producing power, and in the mode of effecting the same, applicable to various useful purposes.*—[Sealed 16th Dec., 1833.]

THIS invention of an improvement or improvements in the combination and arrangement of machinery or apparatus, whereby certain well-known agents may be employed in producing power, and in the mode of

effecting the same, applicable to various useful purposes, consists in the combination and arrangement of certain mechanical parts or apparatus, forming an explosive engine, in which volumes of inflammable gases, mixed with atmospheric air, are to be ignited in a close chamber, for the purpose of effecting an expansive force; which force is intended to act upon a working piston, within a cylinder, in the same way as steam is usually applied for the purpose of producing such a power as may be employed for driving machinery in general.

In the accompanying drawings (see Plate VII., fig. 1,) is a front elevation of the engine complete; fig. 2, is a transverse section of the same, in which the internal construction of the working parts are all exhibited to view: *a*, and *b*, are two cylindrical vessels, with hemispherical ends placed beneath the engine, or in any other convenient situation; *a*, is intended to contain carburetted hydrogen gas, and *b*, common atmospheric air: both of which aeriformed fluids are to be compressed within the vessels, that is, held under pressure of from one to two pounds, more or less, upon a superficial inch.

The vessel *a*, is supplied with gas from a reservoir or main through a pipe by the forcing pump *c*; and the vessel *b*, is supplied with air from the atmosphere, also through a pipe by the forcing pump *d*; both of which pumps are worked by excentrics upon the crank shaft *e*, of the engine. The vessel *a*, is furnished with a regulating mercurial gauge *f*, by which, when the pressure of the gas within exceeds the required density, a cock is opened through the agency of rods and levers, as shown in the figures, and a portion of the gas is let off, which returns to the reservoir under the piston of

the pump *c*, thereby preserving a regulated pressure within the vessel; and this pressure may be increased or diminished by weighting the lever *f*. The air-vessel *b*, has a lifting valve *g*, properly loaded, through which the air escapes, when, by the action of the pump, it has acquired too great a pressure.

For regulating the quantities of gas and atmospheric air, which may be proper to be combined for producing an explosive mixture, the apparatus shown at *h*, *h*, is employed. This apparatus consists of a cylindrical vessel, divided internally into two chambers, with a piston in each; which pistons are both attached to a rod *o*, that may be slidden up or down in the centre of the chambers. The large chamber *i*, is intended to measure the requisite quantity of atmospheric air, and the smaller chamber *j*, to measure the requisite quantity of gas.

From the vessel *a*, the gas passes up the pipe *k*, through the cock *l*, into the lower chamber *j*; and from the vessel *b*, the air passes up a similar pipe *m*, through the cock *n*, into the upper chamber *i*.

The pistons of *i*, and *j*, are adjustible upon the central rod *o*, by means of screws cut upon the rod with tightening nuts, which allow either of the pistons to be raised or lowered, for the purpose of enlarging or contracting the relative capacities of the two chambers.

The upper end of the rod *o*, is attached by a shackle to the spindle *p*, which spindle passes up the hollow tube or standard of the governor *q*, *q*, *q*. As the governor revolves according to the centrifugal force of the balls, so the rod *o*, with the pistons, will be raised or depressed; by which raising or depressing of the pistons the capacity of one of the chambers, *i*, or *j*, will be enlarged, and that of the other contracted, thereby

causing the proportions of the two aeriformed fluids, measured by those chambers when mixed, to vary in their relative quantities, and consequently the explosive force of the fluids, on becoming ignited, to be increased or diminished. For on the governor rising by the increased velocity of the engine, the capacity of the chamber *j*, which measures the quantity of gas, will be contracted; and that of *i*, which measures the quantity of atmospheric air, will be enlarged. Hence by these means the expansive power of the explosive mixture will be reduced; or, on the contrary, by a diminished speed of the engine, the governor will lower the pistons in the cylinders *i*, and *j*, thereby enlarging the capacity of the gas-chamber, and reducing that of the atmospheric air, which will consequently increase the elastic power of the explosive mixture.

The two cocks, *l*, and *n*, are connected by a pair of toothed wheels, *r*, *r*, which cause them to turn simultaneously in opposite directions, and which are made to reciprocate by a rod and lever *x*; the latter being acted upon by a rotary cam upon the main crank shaft *e*.

The cocks have each a curved passage, that of *l*, forming a communication in one position between the pipe *k*, and the chamber *j*; and that of *n*, forming a communication between the pipe *m*, and the chamber *i*; but when these cocks are turned into the other position, the apertures of the pipes *k*, and *m*, are closed, and the curved ways form a communication between the two chambers *i*, and *j*, and the passage *s*, which leads to the induction valve or cock *t*.

The induction valve or cock *t*, is made to reciprocate, in order to open and close alternately the passages, *u*, and *v*, leading to the globular chambers *w*, *w*, in which the explosive mixture of air and gas is intended to be ignited. These reciprocating movements of the induc-

tion cock *t*, are produced also by a cam on the main crank shaft *e*, which acts against a bent lever *y*, weighted at one end, and at the other end connected to a perpendicular rod *y*, which is attached to an arm at the end of the plug of the cock.

The explosive mixture having been conducted in the way described through the induction cock *t*, and passage *u*, into the lower globe *w*, a small flame from the jet of a gas-burner, issuing from the pipe *z*, is then admitted through a touch-hole in the under part of the globe to the interior, by which the explosive mixture within the globe is immediately ignited, and, in exploding, passes along the channel A, into the lower part of the working cylinder B, beneath the piston C; which piston, by the force of the expanding vapour, is raised up to the top of the cylinder. This upward movement of piston C, through the agency of the cross-head D, and connecting rods E, E, will produce a rotation of the crank shaft *e*, in the same way as in ordinary steam-engines; and the shaft *e*, in revolving (by means of the cams above described), will give those movements to the levers and rods *y*, *y*, and *x*, *x*, which are requisite for changing the positions of the cocks or valves *l*, *n*, and *t*, and letting off the explosive mixture into the upper globe *w*, where, being ignited, it proceeds through the passage F, and exerts its force against the upper side of the piston, which causes the piston to descend, and thus produce the rotary motion of the crank shaft.

Previously to the explosive mixture of gases entering either end of the working cylinder, a disc valve H, is brought up against the extremity of the passage A, or F, in order to close the eduction aperture, which movement of the valves is effected by an inclined plane I, or I, on the edge of the sliding bar K, as shown in the

section, fig. 2. This bar is connected by a joint to the shorter arm of the bent lever *y*, and is moved up and down at the proper periods by the rotary cam upon the crank shaft *e*, which works that lever as before described. After each stroke of the piston, the eduction vapour is allowed to pass off from the passage A, or F, through the pipe G, by the receding of the disc valve H, which is forced back by the eduction vapour when the elevated part of the bar K, is slidden away.

In order to prevent the explosive gases escaping from the globe *w*, through the touch-hole, a sliding plate is placed over the touch-hole, which is moved away at the instant that the jet of flame from the pipe *z*, is intended to communicate with the interior, and when that is done it instantly returns and covers the touch-hole. These sliding plates are each mounted upon an arm L, L, extending from M, a perpendicular shaft, which turns upon centres. A slight reciprocating movement is given to this shaft M, by a small tappet N, upon the rod *x*, which in rising presses against a lever O, and turns the shaft a little way round, after which a spring returns the shaft to its former position.

By the ascent and descent of this rod, the sliding plates are made to open and close the touch-hole at the required periods. The rod of the piston P, is made hollow, for the purpose of receiving a column of water, which is allowed to flow at the bottom of the rod, through small holes into the packing of the piston, for the purpose of lubricating and keeping it cool. The working cylinder is enclosed within a jacket Q, Q, intendedto contain water, to be supplied by a pipe from a cistern placed in any convenient situation, which is designed to prevent the working cylinder becoming too hot.

Fig. 3, represents one of the globular vessels *w*, de-

tached and in section, through the centre of which a rod R, is passed, having a ball-valve S, at one end, and a stuffing-box T, at the other end. Globular vessels so constructed may be adapted to the engine, instead of those already described; by means of which I propose to introduce, in addition to the expansive gases, a volume of condensed atmospheric air, which is to occupy the passage A, or F, and the end of the working cylinder. This air may be supplied by a forcing pump, and a small quantity of steam may also be advantageously introduced. The ball-valve may be kept up to its seat by a spring or a weight on the outside of the stuffing-box, and when the explosion of the gaseous mixture in the globular vessel *r*, takes place, the valve will be forced open, and the vapour allowed to pass into the passage A, or F, when, by mixing with the condensed air and steam, the expansive force will become greatly increased.

Having described the several parts of my improved machinery or apparatus, and the mode of using the same, I wish it to be understood that I claim the general arrangement and combination, as an engine, for producing motive power by the employment of the agents above described; and also the particular construction of the apparatus, called the regulator, by which the power to be produced by the engine may be varied and regulated.—[*Inrolled in the Rolls Chapel Office, June*, 1834.]

Specification drawn by Messrs. Newton and Berry.

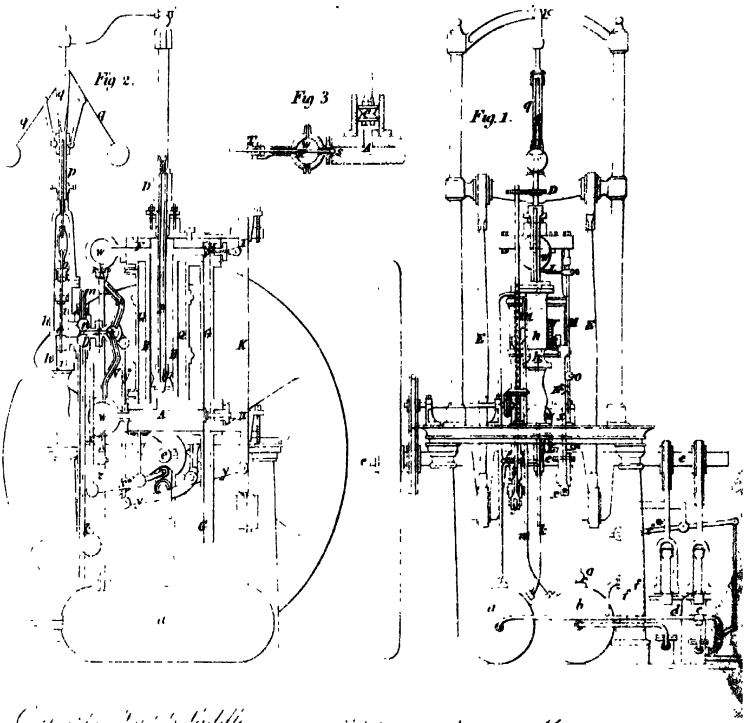
*To* RICHARD HOLMES, *of Kingston-upon-Hull, in the county of York, for his invention of improvements in apparatus for generating steam, and in other parts of steam-engines; and also in the means of producing heat.* —[Sealed 7th November, 1833.]

THERE are three distinct features of improvement proposed under this patent; the first applies to the construction of a boiler for generating steam; the second to the apparatus for producing condensation; and the third to a peculiar mode of supplying fuel to the furnace, by which it is considered that the combustion of the fuel will be more perfectly effected than by any other means heretofore known.

Plate VII., fig. 4, represents a vertical section of the improved construction of boiler or generator taken through the middle: *a*, *a*, are the furnaces intended to be supplied with fuel through the bent tubes *b*, *b*, at bottom, by means hereafter to be described. The furnaces are enclosed and surrounded by narrow passages *c*, *c*, *c*, *c*, containing water, which open into the square part of the boiler *d*, *d*, above: *e*, *e*, *e*, are a collection of tubes standing vertically in the central part of the boiler, and surrounded with water, which tubes are intended to conduct the smoke and heated vapour from the furnace into the upper chamber *f*, and in its passage to assist in heating the water in the boiler.

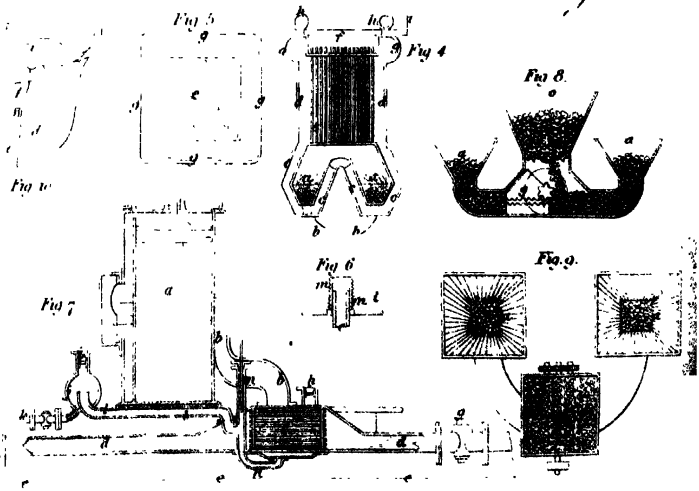
An enlarged part *g*, *g*, above the boiler, shown in the horizontal section, fig. 5, receives the steam generated from the water below; and from this the steam passes into an upper receiving tube *h*, *h*, through a narrow slit or opening, extending along the bottom part of the tube. This tube is called a steam-chest or reservoir,

Wright's Power Engines




Barrett's Propelling Paddle

Wilson's Steam Machinery



from whence the steam passes by a pipe *i*, to the induction passages of the working cylinder.

This contrivance of the receiving tube *h*, with the long slit or aperture below, which constitutes the main feature of improvement in reference to the boiler, is described by the Patentee as operating in the following manner:—"The steam from the surface of the water rises through the slit of the tube all round, the area of which slit should be about the same as the eduction pipe; by which means the rush of steam will not only be in one direction, but is diffused over an exceedingly long minute surface, and thus tends more effectually to separate the steam, and prevent it carrying over the water."

The Patentee says, that he has not thought it necessary to show the safety valves, gauge cocks, and other requisite appendages to a boiler, as they are well understood, and will be readily applied; but as to the mode of fixing the vertical tubes which constitute the flues, there being novelty in the contrivance, they require particular explanation.

The lower ends of the tubes are made fast in circular apertures perforated through the plate *k*; but the upper parts of the tubes are so fitted in the apertures of the plate *l*, that they may be enabled to slide upwards or downwards in their socket joints, according as the expansion or contraction of the metal takes place by variations of temperature.

Fig. 6, represents in section a portion of one of the tubes *e*, as it is connected at the sliding joint; *l*, is the top plate of the boiler, into a recess in the under part of which a ring of lead, or other fit material, is inserted as a packing or stuffing, for keeping the joint water and steam tight. A short tube, or cylindrical ring *m*, is

screwed into the aperture of the plate, in which the end of the tube *e*, is allowed to slide, as it expands or contracts.

The apparatus for condensing the steam, as it passes from the eduction passage of the engine, is seen in the sectional elevation of a marine engine taken longitudinally, and shown at fig. 7: *a*, is the working cylinder; *b*, the eduction pipe, carried round the outside of the cylinder to the condenser *c*. This condenser consists of a considerable collection of tubes placed horizontally, and open at both ends into a horizontal water-way *d*, *d*. These pipes *c*, are "placed in such positions, as to be operated upon by the cooling effects of a stream of cold water flowing from stem to stern of a ship or other vessel by the progress of such vessel." The keel and keelson of a vessel are represented at *e*, *e*, upon which the tube forming the water-way rests, below the level of the water line of the floating vessel; and *g*, *g*, are stop cocks for opening or shutting the flow of water, or for regulating the quantity passed.

The upper part of the condenser has an air valve *h*, by which any air may escape from the body of the condenser; and *i*, is described as another air valve, more effectually to get rid of any air which may be separated in the operation of condensing the steam.

This valve *i*, is placed upon a vessel *j*, partly filled with water, into which the pipe *k*, passes from the condenser. Into this vessel also the pipe *l*, enters, by which water is supplied to the boiler through the agency of the pump *m*.

The Patentee proceeds to describe the manner in which this apparatus acts:—"On opening the stop cocks *g*, *g*, the vessel *d*, *d*, will become full of water, and fill the series of tubes *c*, which constitute the con

denser, the space or box surrounding the tubes being opened only to the steam eduction pipe, so that the condensing water does not come in contact with the steam, but effects its condensation by the cool surfaces of the tubes of the condenser.

"It will thus be evident, that on starting the engine the progress of the vessel will cause a flow of water through the pipes *d*, *d*, and also through the tubes of which the condenser is formed; and the steam, on leaving the cylinder, rushes through the eduction pipes among the tubes, and becomes condensed, and the water flows through the pipe *n*, into the force pump, by which it is forced forward to the vessel *j*, and thence to the boiler. Such will be the continued operation of the apparatus, the condensed water being returned from time to time to the boiler."

The third improvement relating to the supply of fuel to the furnace, we cannot from the specification understand the operation of in any practical way; we therefore give the words of the Patentee, literally refering to a vertical section of the apparatus, shown at fig. 8, and to a horizontal section or plan of the same at fig. 9.

"Into the hopper *o*, the coal or coke is supplied: *p*, *p*, *p*, are three grooved rollers placed at the bottom of the hopper, by which the coal or coke is alternately forced forward into the two parts of the furnace (*a*, *a*, fig. 8); and thus the fuel being at all times brought up from below, it will burn off from the surface; the smoke and gas having to pass through the previously ignited fuel, produces a more effectual combustion, and tends to destroy the smoke. The piston *g*, may either be actuated by a mangle movement, or by a crank, or other well-known means of producing a reciprocating

action to the piston, the piston having an angular top, by which the coal or coke falls to that side to which the coal is next to be forced. The middle roller *p*, is made to gear into the pinion of the side rollers alternately, one roller standing still at the time that the other is assisting to supply the coal and coke."

The Patentee concludes by saying, that he lays no claim to any of the parts separately of which the invention is composed, nor does he claim as new the application of a series of tubes for the purpose of condensing the steam of steam-engines, nor of supplying the fuel from below, these having been before practised; but he claims as his invention, "First, the application of a vessel *h*, (fig. 4,) to a steam boiler, such vessel having a minute slit or opening for the passage of the steam, whereby the rush of steam from the surface of the water is diffused over a considerable extent of surface, and thus tend to separate the water from the steam, as above described; and also for the particular method of fixing the tubes which constitute the flues, when the same is applied to steam boilers or generators; thus allowing of a longitudinal expansion or contraction, as above described.

"Secondly, in placing a condenser, consisting of tubes, as above described, in a vessel or pipe open to a flow of water through a ship or vessel, as above described.

"Thirdly, in the peculiar arrangement of apparatus for supplying fuel to two parts of a furnace by the reciprocating piston, as above described, whereby a most effectual combustion will be obtained."—[*Inrolled in the Inrolment Office, May*, 1831.]

*To* JOHN BEARE, *of Pall-mall East, in the county of Middlesex, civil engineer, for his invention of certain improvements in engines or machines for raising or conveying water, or other fluids.*—[Sealed 12th April, 1834.]

THIS invention of certain improvements in engines or machines for raising or conveying water, or other fluids, consists—"Firstly, in an improvement in the form or construction of the chambers of a vacuum pump, which is designed for the purpose of affording greater facility of access to the bucket and other internal parts, than can be obtained by the ordinary constructions of pumps. Secondly, a variation or modification in the construction, by which the same advantages may be obtained in reference to a lift or force pump. Thirdly, a contrivance, which I call an air-retainer, for the purpose of assisting the upward flow of the liquor through the suction pipe. Fourthly, the adaptation of a mechanical apparatus, by which I am enabled to combine the operations of a vacuum pump and a force pump, with the ordinary action of the lever of a water-closet: and fifthly, in the employment of a flexible diaphram, connected to the piston of a beer-engine."

In the accompanying drawings (see Plate VIII.), fig. 1, represents the external appearance of a ship's pump, constructed with the first-mentioned improvement. Fig. 2, is a section of the same, taken vertically through the middle of the pump, showing the whole of the interior and the working parts. The upper and lower chambers *a*, *a*, and *b*, *b*, are of cast iron, or other suitable material, formed in one piece without flange joints. The cap, cover, or top piece *c*, is movable,

being loose, and fitted to the rim of the upper chamber by a lip; it is thereby capable of being instantly removed, in order to obtain access to the interior. In this pump I employ a flexible conical diaphram *d*, of leather, or other suitable material; the one part of which is secured to the bucket, and the bell-formed shield *e*, employed to prevent the diaphram from collapsing as the bucket ascends; the other part of the conical diaphram is by a couple of brass or copper rings, *f*, *f*, screwed together, nipped tightly, as shown, detached from the pump barrel at fig. 3. The bucket is then let down into the barrel, as seen in fig. 2, the rings resting upon the inner ledge *g*, *g*, of the chambers; and they may, if required, be slightly fixed within the barrel by a wedge driven between the barrel and the edge of the rings, or by any other convenient mode.

Fig. 4, is a lifting or forcing pump for mines or deep wells. This figure represents the external appearance of the pump as fixed within a well. Fig. 5, is a vertical section of the same, taken through the middle of the pump, showing the parts within. In this instance the chambers, with the cap also, are cast in one piece, having an opening or man-hole on one side of the upper or square chamber at *a*, *a*, *a*, *a*, which is closed by a plate *b*, bolted with packing, as seen at fig. 4.

Fig. 6, the contrivance which I call an air-retainer, represents the upper part of the suction pipe attached, as usual, by flanges, to the bottom of the lower chamber of the pump-barrel. Fig. 7, is a section of the same taken through the middle. This portion of the suction pipe is considerably enlarged in its diameter, for the purpose of affording space within for the reception of a volume of air, the elastic force of which is intended to aid the ascent of the water. Within this

enlarged or protuberant part of the suction pipe *a*, *a*, a tube, *b*, is inserted, which is held by an upper rim or flange, between the bottom flange of the chamber and the top flange of the suction pipe. This tube enables a volume of air to occupy the interior of the suction pipe, and prevents that volume of air from being drawn up into the pump-barrel, and which, thus confined by the tube *b*, in the space *c*, *c*, within the suction pipe, acts continually as an elastic pressure, aiding the upward flow of the water or other liquor.

Fig. 8, exhibits in elevation the external appearance of the principal parts of a water-closet, which is designed to act without the necessity of placing a cistern of water above. In this figure, *a*, is the basin; *b*, the discharging valve-box; *c*, the discharging pipe; *d*, *d*, the lever, by means of which the discharge valve is opened by a handle and rod *e*. A barrel or chamber *f*, contains the plunger of a lifting and forcing pump, and to the bottom of this pump the suction pipe *g*, is attached, leading from a reservoir *h*, below; and *i*, is the pipe or tube by which water is forced up by the pump into the basin. To the lever *d*, the pump rod *k*, is connected by a joint, so that in raising the handle *e*, for the purpose of opening the discharge valve, the lever *d*, also lifts the rod *k*, and causes the plunger to force a volume of water up into the basin; and in depressing the handle *k*, again, the discharging valve is closed, and the plunger forced down, ready to lift another column of water at the next stroke.

Fig. 9, is the external appearance of one of the barrels of a beer-engine. Fig. 10, a section of the same; and fig. 11, shows the flexible conical diaphram detached. In this instance the outer edge of the diaphram may be confined between the flanges of the

upper and lower portions of the barrel, or it may be confined by rings, and placed upon a ledge within the barrel, as described in reference to fig. 2; the inner part of the diaphram is to be attached to the bucket also, as fig. 2; and the foot valve is formed by a perforated cork, with a clack on the upper side. When adapted to a beer-engine, this contrivance will be found to be less liable to derangement in working, and more economical in cost, than any other of the old plans, and will remain perfectly free from any of the poisonous effects arising from the oxydation of metals, which have heretofore so frequently occurred in beer-engines.—[*Inrolled in the Rolls Chapel Office, October*, 1834.]

Specification drawn by Messrs. Newton and Berry.

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In reference to the above inventions, the Patentee has communicated to us the following observations:—

"Being the sole proprietor of the patent granted to my uncle, Mr. William Shalders, under the title of the Gravitating Expressing Fountain, in April, 1825, my object has been the acquirement of the long and much-sought desideratum in hydraulics—lifting water without the loss of power.

"By the inventions I have patented, I am enabled to manufacture pumps and engines for all hydraulic purposes, free from the defects of friction, leakage, liability to derangement, choking, or other defects; and in many cases avoiding enormous expense, by the adaptation of machinery of the simplest possible contrivance.

"The result of my labours in hydraulics, unremittingly given for many years past, clearly show that I

Improved Pumps

Fig. 7.

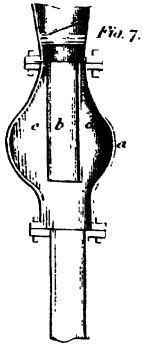



Fig 6




Fig 2

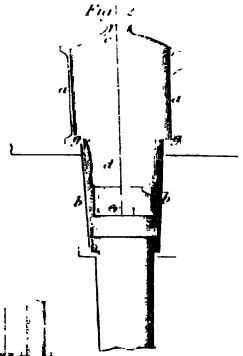



Fig 1

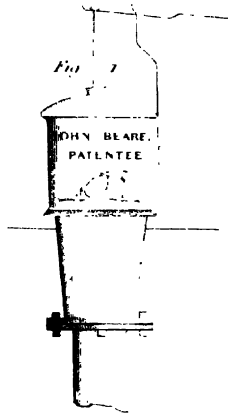



Fig 8

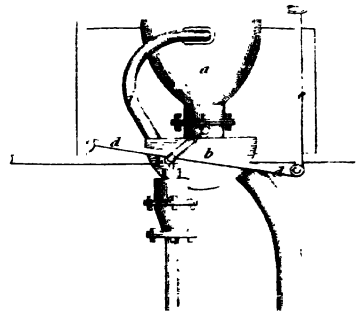



Fig 4

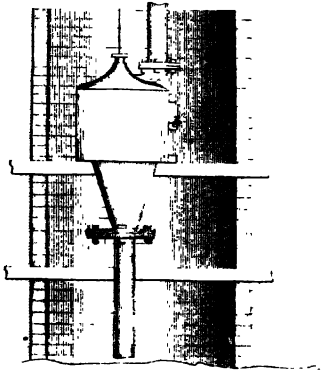


Fig 5

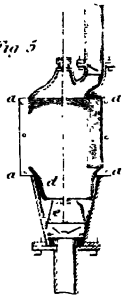



Fig 3




Fig 11



Fig 9

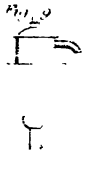
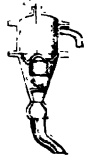


Fig 10



enable one man to perform with ease the work of two men, and substitute the labour of a lad for that of a strong man, compared to any other pump ever before invented.

"In the Royal Navy, my patent fountain pump, on board a first-rate man-of-war, has enabled one man to raise an equal quantity of water to that which three men could raise at the common friction pump fixed alongside; and as a substitute for the old chain pump, it will give an immense economy and security to the naval service.

"In the Indian and General Merchant Service, alike palpable superiority has been in every instance displayed. One captain writing—'Our pumps on the old friction plan were worn out in a short time, and we had then only your patent fountain pump to depend on. For nineteen days and eighteen nights your pump was in constant action, without a minute's respite, all hands being engaged to relieve each other at the work, and at length happily brought us safe into the London Docks.' The captain of the 'Lady Flora' Indiaman observes—'With four men, and one of your patent pumps, we can throw more water than we can discharge with both the old main pumps, and as many hands (sixteen or eighteen) as can lay on to the brakes.'

"An eminent maltster observes—'One man at your pump has always been able to beat two men employed at the common pump; and in some instances I have found one strong man nearly equal to carry the work of three men at the old friction pump. I consider it something in the light of a benefit ticket.'

"As street and road pumps for agricultural drainage, and for the purposes of irrigation for collieries, copper,

and all other mines and in deep well-work, instances of the most striking superiority are already supplied. One testimonial, stating the cost attending the old plan of pumps contrasted with the expenses of the new, shows a saving exceeding £50 per annum by the introduction of the latter.

"By the adoption of my inventions, the artists and manufacturers throughout the kingdom will produce annually a great saving; and when, independent of other interests, we consider, as philanthropists, the vast importance of their introduction to assist in the art of navigation, and the number of human lives which they may indirectly be the means of preserving, it becomes a paramount duty for them to be universally known and diffused.

"With regard to the subject of the present patent, my object has been, first, to afford the readiest means of access to the interior of the pump, in order to remedy any accidental derangement of the bucket or valves with the utmost promptitude, as even small delays under pressing circumstances are often of vital importance to the safety of a vessel and the preservation of lives; and the same facilities apply with great advantage to all cases of mining operations and deep well-work.

"The air-retainer in its practical application gives the extraordinary advantage of enabling a three-inch suction pipe to supply as great a quantity of water as an ordinary five-inch pipe in single action pumps, by effecting a constant flow.

"The double action of the plunger as applied to a water-closet produces, by the most simple means, that very desirable object of rendering the apparatus perfectly inodorous, and at the same time dispensing with

the necessity of a cistern over head, considerably reduces the first cost of the apparatus.

"The adaptation of the flexible diaphram to a beer-engine diminishes the labour of working it, and avoids the possibility of any poisonous deposit, caused by the oxydation of the metal, as in the old engines."

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*To* ROBERT WILLIAM BRANDLING, *of Low Gosforth, in the county of Northumberland, Esq., for his improvements in applying steam and other power to ships' boats, and other purposes.*—[Sealed 19th November, 1833.]

THE object of the Patentee is to tow boats upon canals and rivers by the power of stationary engines placed by the river or canal side, or by locomotive engines, made to travel along a path having a conducting apparatus parallel to the edge of the water.

The Patentee says, that having been precluded from making experiments by the fear of exposing his invention prior to inrolling the specification,* he has been unable to state dimensions and proportions—indeed,

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* It is always to be considered that an invention is secured to the Patentee from the day on which his patent passes the Great Seal. It must, however, be remembered, that under our existing imperfect patent laws, on petitioning for a patent no sketch or description of the principles or general features of an invention is given by which the precise character of the invention can be identified beyond the words of a vague title: which is frequently found to bear various interpretations, and may be adapted to a wide range of subjects. It is, therefore, necessary that a Patentee should look with great circumspection at the

we should presume that he had never attempted to reduce his scheme into a tangible shape, for we have seldom met with more crude and undigested machines than those which are represented by the rude outline drawings accompanying this specification.

The objects of the Patentee are said to be accomplished by means "of resisting guides, or frames moving upon and retained in a proper position by wheels and rollers attached to strong posts, fixed at certain intervals apart along the side of the river or canal, and allowing these guides or frames with the arms, by which they are attached to ropes or chains of stationary engines, or to locomotive engines, to pass without obstruction."

Plate IX, fig. 9, is a plan or horizontal representation of the edge of a canal: *a*, being a boat required to be towed along; *b*, is a rope extending from the boat, which is to be attached to the locomotive carriage *c*. This carriage, running upon wheels, may support a steam-engine, or any other apparatus capable of producing locomotion, or the power of impelling itself along the ground.

From the side of the locomotive carriage, arms *d*, *d*,

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titles of all the recent patents that have preceded his own, the specifications of which remain to be inrolled: least a knowledge of his invention should be obtained, and surreptitiously incorporated into the specification of some other patent, the title of which might embrace similar objects. These remarks apply particularly to the above patent, as between the date of its passing the Great Seal and of the period for inrolling its specification, no less than fourteen other inventions had to be inrolled for subjects connected with steam and other impelling powers applicable to propelling and locomotion on land and water.—Ed.

extend, which connect the carriage to a long bar or rail *e*, *e*. This bar is intended to be the guide or conductor of the carriage. A series of posts *d*, *d*, *d*, *d*, *d*, are placed in a line, at convenient distances apart, near the edge of the canal, having antifriction wheels on their sides, against which the guide-rail runs as the carriage moves onwards.

Fig. 10, is intended to be a transverse vertical section of the canal, with the guide-rail and post, and the carriage in the act of towing a vessel along. We have endeavoured to render this figure intelligible, which is not the case with the original, but we are doubtful whether we have succeeded.

Several other extremely rude outline sketches accompany the specification, which are intended to represent different modes of confining or guiding the carriage, two of which (figs. 11 and 12,) we select as specimens, but cannot undertake to explain their parts; they are said to correspond with the parts described in the two first figures.

The Patentee, in further explanation of his invention, says, "These guides, when stationary engines are used, are moved by single or double ropes, or chains attached to the ends or arms, or by endless ropes or chains attached to one or more of the arms projecting from the guide or frame; and which endless ropes or chains are detached from or attached to the guides or frames by machinery, or by the attendants at those points where one stationary engine is intended to cease acting, and another to commence.

"Any number of locomotives may be attached to those guides or frames at different points, according to the power required; and in addition to these retaining guides and frames, with their wheels and rollers, these

locomotive engines may be kept in their proper positions, and the power of the engine in dragging the vessel regulated or increased, by means of compression wheels or rollers forced against a rail by strong springs or weights and levers.

"These wheels act horizontally, or in any other direction in opposition to the line of traction; but the rails against which the wheels act do not necessarily bear any part of the weight of the engine, as that is borne by the wheels running on the towing-path.

"Sufficient play is allowed by the arms and connecting rods, springs, and wheels, so that by no sudden jolt the elevations or depressions of the engine can materially disturb the guides or frames, or compression wheels, so as to prevent their producing the desired effect.

"These compression wheels are worked by cogs and lanterns, which allow them to yield freely, and in the proper direction, to the compressing power. The seats supporting the axles of these wheels move in grooves, and are acted upon by the springs or levers. These compression wheels, and the mode of applying and moving them with the resisting rail, are parts of this invention."

If the towing-path or road is straight and level, the guide or frame may be stiff and without joints, otherwise they must be jointed; the gradual and proper adaptation of the different parts to the curve being effected by strong levers, and by tooth and pinion wheels, or by the use of the resisting rail and compression wheels: in which case the front wheels of the locomotive engine must be allowed to move to answer the bend, and the resisting rail at each end of the curve must have a portion of it straight, at least equal in

length to the distance between the joints of the guide or frame. The rollers, also, which in this case support and retain them, must be of such a length as to allow those parts of the guide or frame, which rests upon or are retained by them, to move freely, while forced by the compression wheels and resisting rail to assume a proper curvature.

"This invention may be used in dragging vessels through narrow tunnels, stationary engines being fixed at either or both ends, and the wheels and rollers at the sides or top; and it may be employed also in moving passage-boats across rivers, or buoys in harbours, and other places where it is desirable to retain the ropes or chains at the bottom, so as not to interrupt the navigation; but in such cases a diving-bell ought to be provided to meet any accident that may happen, notwithstanding the necessary precautions of double ropes or chains, and safety lines attached to the guides or frames, without bearing any part of the ordinary strain.

"The invention may be applied to dragging any carriage upon common roads or rail-roads, and up any ascent; and whether moving along or crossing them, or passing through pleasure-grounds, or along quays, where the ropes, or chains, or guide, would be a nuisance and obstruction.

"The guide or frame-posts, rollers, and ropes, may all be below the surface, nothing appearing but the arm moving along a narrow groove."—[*Inrolled in the Inrolment Office, May*, 1834.]

**It is to be regretted that the Patentee has not pointed out what he considers to be new in this scheme: if we understand the specification at all, a part of it must be the same project as that proposed by Mr. W. F.**

Snowden in the specification of his patent for a "new-invented wheel-way and its carriages, for the conveyance of passengers," &c. &c., granted 18th December, 1824.—(See the London Journal of Arts, vol. x., First Series, p. 137.)—Ed.

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*To* Henry Calvert, *of the city of Lincoln, gentleman, for his having invented or found out an improvement in the mode of making saddles, so as to avoid the danger and inconvenience occasioned by their slipping forward.*—[Sealed 26th October, 1830.]

The improvement in saddles herein proposed consists in the adaptation of a spring on each side of the saddle, which confines it to the sides of the horse, and prevents the saddle from slipping upon his back backward or forward.

Plate VII., fig. 10, represents the saddle as seen sideways, the outer flap being removed to show the situation of the springs. The saddle-tree *a*, shown by dots, is of the usual form; and a spring *b*, made of flat plate steel, slightly curved, is affixed to the saddle-tree on each side. These springs pass through loops, which attach them to the under flap and padding. At the lower end of each spring there is a staple or buckle to which the girth *c*, is appended, and the girth is thereby made to pass round the ribs of the horse close to the hams.

The dotted lines *d*, show the situation of the girth in ordinary saddles; and hence, by comparison, the advantage of the improvement will be understood.—[*Enrolled in the Inrolment Office, December*, 1830.]

*To* ERNST WOLFF, *late of Leeds, in the county of York, but now of Stamford-hill, in the county of Middlesex, gentleman, for certain improved means of supplying heated air, in order to support combustion in enclosed fire-places, being a communication from a foreigner residing abroad.*—[Sealed 23d January, 1834.]

THIS invention consists in the application to enclosed furnaces of a certain apparatus of tubes and other parts, so adapted and arranged that the atmospheric air which is to maintain the combustion of the fuel in the fire-place, is by the draft of the chimney caused merely to pass within such tubes through a sufficient extent of the chimney-flue or cavity, through which the heated air from the furnace escapes, so that before it reaches the burning fuel its temperature has been considerably raised; and the heat of the furnace is thereby much less diminished than it is in ordinary cases, where the combustion is kept up by a continued accession of cold air.

In describing more particularly the arrangement of parts by which the object of this invention is, under various circumstances, intended to be accomplished, reference is made to illustrative drawings appended to this specification, wherein the same parts are distinguished by similar letters or numbers.

In plate IX, fig. 1, is shown the simplest arrangement by which the object of this invention is effected. Into the lower part of the chimney-shaft, from a boiler or other closed furnace, is introduced a bent tube or pipe of iron, one extremity of which opens to the external air, the other into the enclosed ash-pit of the furnace beneath the bars which support the fuel.

The shaft of the chimney must be closed at its lower

part, about the two legs of the bent pipe, so that air cannot pass into it by any other channel than that of the flue or the fire-way from the furnace. It is necessary also that the ash-pit be closed by doors or otherwise, in such a way that no air can enter it but through the inner extremity of the feed-pipe fixed in the chimney. Under such an arrangement, as a current upwards is caused in the chimney-shaft by the rarefaction of the air passing from the furnace, the cooler external air is drawn through the bent pipe, and becomes heated in its passage before it reaches the furnace to support the combustion of the fuel.

By these means a portion of the heat derived from the fire, which would otherwise, and does commonly, escape uselessly through the chimney, is imparted to the air, which is brought in to support combustion, and is thus economised; being brought back again to the fire-place where it aids, to the extent of the quantity so brought back, the effect to be produced by the fire.

The heating pipes should be of as thin metal as is compatible with economical durability, whether they be made of sheet-iron or of cast-iron, or the upper portion of them of sheet, and the lower of cast, where they are exposed to the greatest heat.

The sectional areas of the pipes may be either circular or polygonal, but they should not be of too large dimensions, least the air passing through them should not get sufficiently heated.

The centre of the section, whatever be the form, should never much exceed three or four inches of distance from the bounding line.

The pipes may be disposed in the chimney-shaft or flue, or chamber, either vertically or obliquely, or horizontally, as the convenience of each case may

dictate: but the whole sectional area of the pipe or pipes must not be less than that of the passages betwixt the fire-bars; as, if it is larger than the latter, the circulation of air through them will be less rapid proportionally, and more heat will be therefore taken up.

If it be found that the fire-bars become red hot, it may be taken as proof that a sufficient supply of air is not obtained; and more feed pipes must be employed, or pipes of larger diameter.

It must also be borne in mind, that the chimney-flue or passage must not be over crowded with pipes, that the smoke-way may not be too contracted for the passage of the quantity of air necessary to maintain in full activity the combustion of the fuel.

The length of the heating pipes may vary with the conveniences of the chimney or chamber, unless where it cannot be otherwise done, they should not fall short of twenty feet in length of range through the flue; but the greater distance they are made to traverse through the hot air, the more heat will be absorbed by the air within them.

Fig. 1, shows the application of a single heating pipe in the chimney-flue: *a, a,* is the chimney; *b,* the boiler; *c,* the outward extremity of the heating-pipe, through the aperture of which the external air enters; *d,* the inner extremity of the heating-pipe, the bent end of which turns into the close ash-pit, and is imbedded air-tight in the wall, through which it passes, so that no air but that which has been heated in passing through the pipe can come to support the combustion of the fuel.

The close ash-pit is seen at *e,* the door of which should fit accurately to the frame, so as to prevent the ingress of air that way: *f, f, f,* is the fire-place and

flues of the boiler-setting; *g*, flue into the chimney; *h*, chimney-shaft; *i*, bottom, to close the lower part of the chimney.

Fig. 2, exhibits a mode of inserting two or more heating pipes into the same chimney. Below the place of entrance of the fire-flue into the chimney-shaft, a floor of stone, or other fit material, must be introduced, so as to cut off from the general cavity of the chimney-shaft a small chamber below, from which must lead a passage to the ash-pit. The outer extremities of the heating pipes, turned at right angles, must pass through suitable openings in the wall of the chimney, stopped around the pipes to prevent the admission of air thereby into the chimney; and the inner extremities of the same pipes must pass air-tight through apertures in the floor opening themselves into the air-chamber below the floor. By this arrangement, only the air from without, which has passed through the heating pipes in the cavity, can enter the air-chamber, from which it is drawn through the passage and ash-pit to the fire-place.

The chimney is shown at *a*, and the boiler at *b*, the outer extremities *c*, *c*, of the heating pipes opening through the chimney-wall. The inner extremities *d*, *d*, of the pipes opening through the floor in the chimney into the air-chamber *i*. The ash-pit is shown at *e*, the fire-place at *f*, the flue from the boiler-setting *g*, *g*, leading into the chimney *h*. A passage *k*, leads from the air-chamber *i*, to the ash-pit *e*.

In this way a considerable number of heating pipes may be introduced within the cavity of an ordinary furnace chimney, two or more being inserted into each side-wall. But where a large fire has to be maintained, it may happen that in the chimney already built there will not be sufficient space to dispose of an adequate

number of pipes: in such cases it will be advisable to construct an accessory chamber contiguous to the chimney.

Fig. 3, shows the interior of such a chamber, with a convenient disposition of any required number of pipes: *a*, the chamber; *b*, flue from fire-place into the chimney; *c*, *c*, external extremities of heating pipes; *d*, *d*, internal extremities of the same pipes passing through the floor into the air-chamber *e*, and thence through the passage *f*, from the air-chamber to the ash-pit. The shaft of the chimney must of course be closed below the entrance of the chamber-flue.

Fig. 4, is a horizontal sectional plan of the lower part of the chamber and pipes. In some part of the walling of this chamber there must be a door-way or opening capable of being closed air-tight, sufficiently large for the introduction of the pipes, and for entrance, for the purpose of occasional cleansing of the interior. This precaution applies, of course, to all situations where this invention is employed.

For the boiler-furnaces of steam-boats, in which the economy of heat, and, consequently, of fuel, is of the greatest importance, a somewhat different form and arrangement of the apparatus now described, as applicable to stationary furnaces, are required, in order to accommodate it to the more limited space available on board a vessel. The air-passages cannot have the same extension, and they must be adapted as closely as convenient to the peculiar forms of the boiler and its connected parts. They may be described generally as either being tubes or pipes placed within an enlarged cavity in the fire-flue or chimney, or otherwise spaces or cavities formed by a casing or jacket surrounding or investing some portion of the chimney or fire-way.

Various modifications may be suggested suitable to these circumstances. It will suffice now to describe one of the latter kind, which is the most practicable, as requiring the least space.

Fig. 5, represents the external appearance in part of the boiler of a steam-boat; fig. 6, is a back view of the same, both in perspective; fig. 7, is a geometrical section in elevation, taken longitudinally; and fig. 8. is a horizontal section or plan taken through the flues; in which two last figures the arrangement of the flues and air-passages will be seen: *a*, *a*, *a*, are the fire-places, the fuel resting upon fire-bars, as usual; *b*, *b*, *b*, are the flues leading into the chimney *c*; *d*, is the ash-pit; *e*, the boiler; and *f*, the steam-chamber above.

The chimney is flattened and extended laterally to nearly the whole width of the boiler at its lower part; and this part is covered with a casing or jacket *g*, *g*, on each of its flat sides at about twelve inches distance: within the space betwixt the jacket and chimney, the air from without ascends through the posterior pipes *h*, receiving the atmospheric air at *i*, and which descends down the anterior pipe *k*, receiving heat from the chimney in its passage. The flat trunk or case *l*, lying under the boiler, receives the hot air passed from the chimney jacket, which is conveyed into the several ash-pits by as many rising flues opening therein. These openings are each of them covered by a hinged flap *m*, to keep out ashes, which is not raised, except when it is necessary to clear out the ash-pit.

The specification concludes by saying, "I claim as the invention communicated to me by a foreigner residing abroad, for the introduction of which into these kingdoms his Majesty was most graciously pleased to grant to me the Letters Patent to which this specifica-

tion refers, the apparatus as now hereinbefore described, or variously modified, according to the circumstances under which it is to be applied. By the unassisted operation of which apparatus, the air to support combustion in an enclosed fire-place is caused, merely by the current induced by rarefaction of the air in the ascending flue of the chimney, to pass, either in pipes or chambers, through or contiguous to the space filled by the hot air from the fire, so that such fresh air becomes considerably raised in temperature before it reaches the place where it is to keep up the combustion of the fuel. I do not claim any of the parts mentioned in the above descriptions separately, but only in combination, under arrangements similar to those now described as necessary to effect the object of this invention."—[*Inrolled in the Inrolment Office, July*, 1834.]

Specification drawn by Mr. Toplis.

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*To* STEPHEN HUTCHISON, *of Pall-mall East, in the parish of St. Martin-in-the-Fields, and county of Middlesex, engineer, for his invention of certain improvements in machinery or apparatus for manufacturing gas for illumination; and in the mode or means of supplying gas to the consumer; and also in the construction of gas-burners; parts of which improvements are applicable to other useful purposes.*—[Sealed 12th October, 1833.]

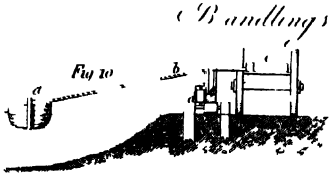
THE subjects embraced by this patent are described in the specification under eight distinct heads. Firstly, a novel arrangement of the internal parts of the furnace, flues, and retorts for generating gas for illumination; secondly, an improvement in the construction of

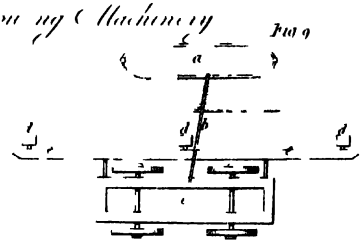
the condenser, by which the gas is cooled down, and the gross parts, as the tar and ammonia, deposited in the bottom of the vessel; thirdly, an improved purifying vessel; fourthly, a superior mode of constructing and suspending the gasometer or reservoir in which the gas is retained; fifthly, the adaptation of a counting machine for registering the quantity of gas received into and discharged from the gasometer; sixthly, the adaptation of a dial and index to the opening valve of the gas main, to regulate and exhibit the quantity of gas passed through that valve; seventhly, the adaptation of a dial and key to the valve of a branch pipe, in order to open or shut the aperture as may be required, and thereby to supply any number of burners with a given quantity of gas only; and eighthly, an improvement in the form of the burner.

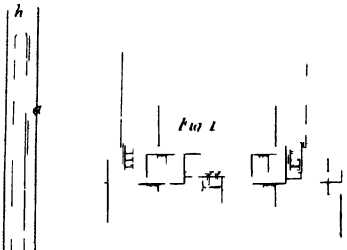
Plate IX, fig. 13, represents the furnace, with nine retorts, *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, *i*, arranged in such order, that the heated vapour and smoke from the furnace *k*, shall be made to circulate round and act upon all of them. This figure, we presume, is to be considered as an elevation, the fronts of the retorts being removed, and the brick arches and flues shown by dots as they would appear in section. The explanation of this figure is not very lucid; but the arrows are described as indicating the course of the flues, one of which is said to be a reverberating flue.

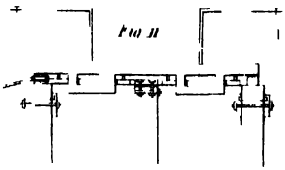
The vertical pipes conduct the gas from the retorts to the hydraulic main above; from whence it passes, in the usual way, we suppose, to the condenser, which forms the second head of the invention.

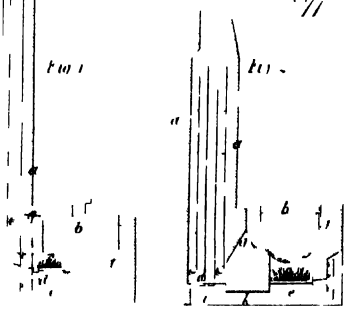
Fig. 14, is a sectional elevation of the condenser, consisting of one tank within another, the inner one being surrounded with water. The interior tank re-

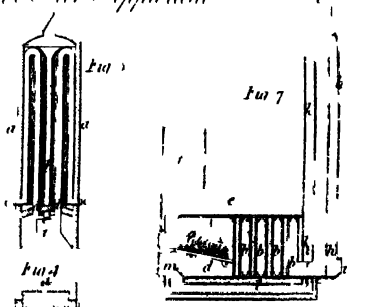

Fig 10
a
b

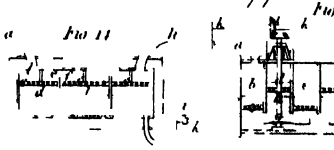

Fig 9
a
b
c
d
e
f

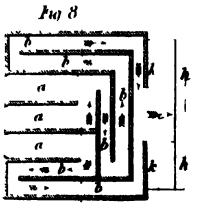

h
Fig 1

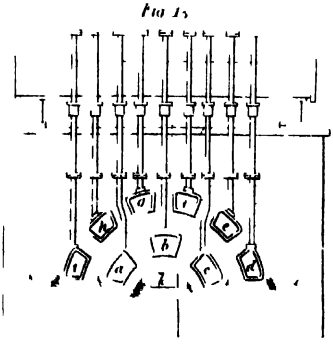

Fig 11

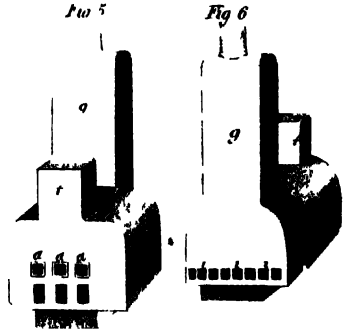

Fig 1
Fig 2
a
b
c
d
e
f
g
h
k


Fig 3
Fig 4
Fig 7
a
b
c
d
e
f
g
k


Fig 14
Fig 15
a
b
c
d
e
f
g
h
k


Fig 8
a
b
c
d
e
f
g
h
k


Fig 12
a
b
c
d
e
f
g
h
k


Fig 5
Fig 6
a
b
c
d
e
f
g
h
k

ceives the gas by the pipe *a*, which, after filling the compartment *b*, passes downwards from that compartment through the holes of a perforated plate *c*, *c*, *c*, and then spreading itself over the larger area of the lower compartment *d*, the gas there becomes cooled, and partially deposits its tar. The gas then rises through the perforated plate *c*, into the next compartment *e*; and from thence passes to *f*, and proceeds downward and through the plate *c*, into the next lower compartment *g*, where a further cooling and further deposition of the tar takes place.

In this way the gas passes through as many of the compartments as there are in the condensing tank, and ultimately is discharged by the pipe *h*, into the purifying vessel. There is a gauge pipe *i*, which allows the tar to discharge itself when it has accumulated above the proper level, and a cock *k*, by which it may be drawn off. In case also of the pressure of the gas being too great within the tank, the pipe *i*, will allow it to escape.

A longitudinal section of the purifying apparatus is shown at fig. 15: it is in a great measure constructed like the condenser. The gas enters by the pipe *a*, into the compartment *b*; and passing thence downward, proceeds through the stratum of lime and water occupying the lower part of the vessel. Having reached the bottom of the compartment *b*, the gas proceeds through the sieve *c*, or perforated bottom of that compartment, and rising up through the water, ascends through the sieve or perforated bottom of the next compartment *d*; and then passing laterally into the third compartment *e*, it descends again through the lime and water as before, and so on through all the compartments, and is discharged ultimately by the pipe *f*, to the gasometer.

In order to promote the purification, the gas must be

brought into the most intimate connexion with the lime held in solution; the lime-water in the lower part of the vessel is therefore to be kept in continual agitation by means of two rotary fans *g*, *g*, which are mounted upon two perpendicular shafts *h*, *h*, having bevel wheels at top. These bevel wheels are driven by two pinions *i*, *i* upon a horizontal shaft *k*, turned by a winch or by any other contrivance.

The perpendicular shafts turn in steps at bottom, and in stuffing-boxes at top, with water-joints, to prevent the gas from escaping.

Access may be had to the several compartments by a man-hole in the side of each, as shown at *l*; and a gauge and vent-pipe *m*, is connected to the vessel for the same purpose as described in the condenser, and also a cock for drawing off the water.

The gasometer is made of several cylindrical pieces, sliding one within the other like a telescope, in order that it may expand to a large capacity, or contract into a small compass. The Patentee doubts whether this contrivance is new; he has, however, never seen one so constructed; but he claims to have invented the water-valve joints, by which the sliding cylinders are connected together.

This plan of constructing gasometers is so well known, that we presume no further description of it is necessary; we published in our journal an account of such a gasometer about ten years ago.

The fifth improvement consists in connecting a counting machine to the gasometer, which is done by fixing a toothed wheel upon the axle of one of the pulleys that the chain passes over, by which the gasometer is suspended. The teeth of this wheel take into the spiral groove of a vertical shaft, mounted by

the side of one of the standard pillars; and consequently, as the pulley goes round, the toothed wheel causes the vertical shaft to revolve. A pinion fixed to the lower part of the vertical shaft takes into one of a train of wheels, and to these an index and dial is attached, in the usual way of constructing counting machines. By these means, as the gasometer rises, one index denotes the quantity of gas it contains at any given time; and as the gasometer descends, another index shows the quantity of gas discharged.

A dial and index adapted as a gauge to the exit valve of a gas-main forms the sixth head of the invention; it is to enable the valve to be partially opened or closed, so as to pass any required quantity of gas. The seventh appears to be a nearly similar apparatus, adapted to the valve of a branch-pipe to open or shut the way, as may be required. Neither of the three last mentioned contrivances are shown in the drawing as adapted to their working situations; and one of them (the sixth) is disclaimed, as forming no part of the Patentee's inventions. We are quite at a loss to understand how it happens, then, that this is set out as one of the several features of improvement.

The eighth and last subject of these inventions is an Argand gas-burner, made cylindrical, both within and without, but beveled off at the top part within, in order to form an enlargement or cup for the free action of the atmospheric air at the part where the gas passes into a state of combustion.

There are several other figures of burners of the ordinary kind represented in the drawings, but they are not referred to in the specification.—[*Inrolled in the Inrolment Office, April*, 1834.]

# ORIGINAL COMMUNICATIONS.

*To the Editor of the London Journal of Arts, &c.*

## ON SUGAR REFINING, AND DR. URE'S EXPERIMENTS.

*(Concluded from p. 82.)*

In continuation of this subject, it becomes necessary to offer some explanation of the causes which occasionally produce great loss in the evaporation and crystallisation of raw sugars. Every matter which in solution is capable of that re-arrangement of its primitive particles, which is termed crystallisation, combines in the course of this process with a certain quantity of the water or other solvent, in which such matter is dissolved. This portion of the water or solvent becomes solidified and latent; it cannot be again extracted by the ordinary processes of desiccation, but only by the chemical destruction of the crystal by distillation in a retort, or other decomposition of the substance crystallised. The portion of water so combined is termed the water of crystallisation.

In the case of sugar and other vegetable crystals, naturally and originally combined with acid matters, the quantity of the water of crystallisation differs greatly. Sugars technically termed *weak*, have in the process of their first crystallisation and granulation, combined with larger proportionate quantities of water so rendered latent, than have the stronger sugars. It requires great experience and judgment in the choice of raw sugars best adapted to the purposes of the refinery. Notwithstanding the exercise of the best discrimination, the experienced refiner is frequently misled as to the real strength of the raw sugar subjected to

the process of refinery, in respect of the quantity of water of crystallisation; and he then finds that in order to bring such sugars to the proof, a much longer evaporation is necessary, and that the proceeds are proportionately reduced. The superfluous quantity of water of crystallisation literally *flies up the chimney* in the form of steam.

I will now apply this explanation in elucidation of the apparent differences of some of Dr. Ure's results, and of the difficulties he has experienced in attempting to account for those differences. I must first draw the attention to the very small proportion of the loss or waste in Experiment No. IV., to which Dr. Ure so frequently refers, in describing "the prodigious waste" and loss by apparent substraction or destruction of the syrups in Experiments No. V. and VI. The Experiment No. IV. was made with fine *clayed* Brazil sugar, which cost 54s. per cwt., nearly 9s. per cwt. more than the average price of the preceding experiments, the market being nearly the same. Dr. Ure informs us, that clayed sugars are in the colonies subjected to a process nearly similar to our refining; in fact, *they have been subjected abroad to a preliminary* refine. The loss per cwt. upon Experiment No. IV. is stated at 3·74 lbs. This forms no datum whatsoever for the comparison of the other experiments.

The sugars subjected to process in Experiment No. I. were clayed Brazils, certainly, but of the lowest quality—"*sour and foul.*" They were charged with superabundant water of crystallisation. The waste or loss of this experiment was 7·38 lbs. per *cwt.* Such a loss upon *such* sugar, in a first or seasoning experiment, would have been calculated upon by any competent refiner. The waste in Experiment No. II. is 6·5 lbs.;

in No. III. about 5 lbs. to the cwt.; and the treacle in the latter experiment was much beyond the average, as might be expected; the Jamaica sugar employed being "*dark, and replete with* molasses." In fact, the sugars used in the first four experiments were of a quality that would not have been employed by refiners, and they should not have been put into an inexperienced person's hand, such as was Dr. Ure; as the nature of sugars for the purpose of determining so important a question between the Government and the refiners as the drawback allowance is. The discrepancies in Dr. Ure's results are very great, and certainly cannot be accounted for on ordinary principles; and there are unfortunately so many gross errors pervading the whole of his operations and calculations, that no dependence whatever should be placed by the public upon them as data for determining the true relative equivalent amount of drawback to be allowed as a counterbalance to the duty upon the raw sugars. The ordinary, even, and long-continued processes of an actual refinery can alone determine the question.

Whilst Dr. Ure is perplexing himself and his employers with minute calculations and comparative statements, almost every one of which is erroneous, or proceeds upon false data, the most material errors have escaped his notice and indefatigable acumen. One instance in the manufacturing department may suffice. Dr. Ure is not to blame; but those who foolishly employed a mere scientific man, instead of a practical man of integrity, in one of the most complicated of manufactures.

For the first experiment "about 15 tons of Brazil sugar were purchased," p. 139. Of this quantity 152 cwt. 1 qr. 13 lbs. are stated in Experiment No. I.

to be melted in the pan; 100 ditto in Experiment No. II. No further mention of the 15 tons of Brazil sugar is given, leaving about 48 totally unaccounted for in Dr. Ure's tables!!!

How can this truly "enormous" defalcation be accounted for? Was it extracted, subtracted, washed, squeezed, turned over, or did it escape into the drain, or out of the house, notwithstanding the officer's known care, and Dr. Ure's acknowledged sagacity? The 48 unaccounted for were either used in the process of the experiments, or they were not so used. Dr. Ure may choose the horn of the dilemma most conducive to his ease to ride upon; but in either case the whole of his results, and the main question at issue, are rendered fallacious, and become perfectly mystified by this single discrepancy! Again, in Table I., page 141, the duty upon the Brazils sugar melted is stated and calculated at 24s. instead of 26s. per cwt., making the real cost of the sugar 15*l.* 4s. 9d. less than it should be charged at in the statement; and of course so much *against* the refiner in the estimation of an equivalent drawback. Another material error pervades the learned doctor's calculations throughout. He calculates the drawback upon the bastards, viz. 30s. per cwt. in each table, in making up the total amount of drawback received. Government and the trade know that bastards never are, nor indeed can be, exported at that drawback in any quantity to effect a fiscal calculation. In the refining abroad they receive our low lumps at the single drawback of 46s.; there is, therefore, a bonus of 16s. per cwt. given to the merchant for exporting a quality of sugar infinitely superior to bastards, at a price scarcely beyond that of bastards. The insertion, therefore, of this amount of drawback, *which*

*might be* received, if consumers abroad would take the singular fancy of using our filthy bastard sugar at the cost at which they might obtain our lump-sugar, is perfectly fallacious. After making all these manufacturing and fiscal errors, Dr. Ure adds another, which pervades every table of his sales and calculations of profits. He places to the *profit* of the refiner in each instance the loss which he states the Government to have suffered, by granting a total amount of drawbacks beyond what the refiner is entitled to, vide Nos. 25 and 27. This is perfectly absurd. By his Custom-house sales he shows the whole amount in money received at the LONG price, that is, including ALL that the merchant or consumer will give for the produce, they, *not* the refiner, then taking the drawback upon such portions as they choose to export.

The whole advantage of the over-allowance of drawback, if any, by the Government, is therefore included in the long market price given for the goods by such purchasers. The price is certainly better for the advantage given to exporters by the drawback system; but after charging the *whole* amount which came to the refiner's hands by the sales of the produce, to add, in each instance, a profit which *did not* come into his hands, is a novel method of mercantile balancing, which, in honour to the inventor for its true simplicity and singularity, I will take leave to call URBAN. Such are the main errors which the doctor's series of calculations contains; they *all* make against the trade—they tend only to embarrass the question—to confound the truth—and, excepting they may be in perfect keeping with the usual mystification of Treasury accounts, they can only serve to perplex the most sagacious Chancellor of the Exchequer; and the

numerous minor arithmetical errors may be passed, as not affecting the main results; but I must observe that in a *public* document, professing to adjust calculations to farthings, there should have been some *decent* attention to the higher claims of pounds and shillings. There is scarcely one calculation in ten which is not erroneous in its fractional portions.

My Lord Althorp may possibly deem it necessary to institute another set of experiments: I trust in such case a practical refiner may lend his efficient assistance to Dr. Ure, or any other scientific gentleman employed. The whole matter is of great public importance, and well deserves the attention bestowed upon it in this Journal. J. L. S.

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ON PRESERVING THE SHEATHING OF SHIPS' BOTTOMS.

We have received the following communication from Dr. Bompas on the subject of sheathing ships, referring to his patent of November, 1830, reported in our Journal, vol. i., Conjoined Series, p. 418. We are at all times ready to correct any errors which we may have fallen into in mistaking the intentions of a Patentee; but in the present instance we do not perceive, from the Doctor's own showing, that we have in any degree misrepresented his views, or given a false report of his specification. However, as the means of preserving the sheathing of ships from corrosion is a subject of very great importance, the appropriation of a page or two of our Journal to the Doctor's observations, which certainly throw considerable light upon that matter, will not be considered out of place. The following is the Doctor's letter:—

*To the Editor of the London Journal and Repertory of Arts, &c.*

"Fishponds, Bristol, Oct. 11, 1834.

"Sir,—Had I not been a subscriber to the *Journal of Arts and Sciences* from its commencement, I might have possibly passed over without observation, and without troubling you, a misrepresentation (arising, I doubt not from inadvertence,) of my patent for preserving copper and other metals from corrosion, which appears in the Number for December, 1832. The paragraph containing the description of the patent is most incorrect in every particular; whether the nature of the alloy, the fluid in which it is to be exposed, or the situation to which it is to be attached is considered. The nature of the alloy varies with the metal to be protected; but they must be immersed in a saline fluid or acid solution, and are to be attached in various ways to the metal to be preserved. The principle of the patent varies essentially from Mr. Pattison. He uses a simple metal; I use an alloy. The only mode in which he can regulate the electric action, is by altering the size of the protecting metal: I do so by altering the composition of the protecting metal. There is also one other essential difference in our plans,—his will not succeed; mine will. I am justified in saying that his will not succeed, from having myself tried it many months before his patent was sealed, and relinquished it on account of the foulness produced by the excessive electric action excited between the two metals, zinc and iron, when placed in contact in salt-water. I think, also, I am justified in saying, that my plan will succeed, because I have found, from experiment, that iron, by altering the proportions of the metals in the alloy, vary the degree of waste at pleasure; and because in no instance has the protected metal become foul from the adhesion of weeds, &c., on its surface. I am not surprised that errors should occur in such works; it is, however, of considerable importance to the parties, that if any description be given of a patent, it should be an accurate one; and it is also of more importance to the readers, who may otherwise in a variety of ways be misled. I have enclosed a statement of the principles on which my plan is founded, and having

called your attention to the subject, shall rely with confidence on your taking some method of correcting the mistake into which you have fallen, so as to prevent any injury arising to me in consequence. "I am, Sir,

"Your obedient servant,

"GEORGE G. BOMPAS."

It is a well-known fact, that when dissimilar metals are placed in contact in a saline or acid solution, such as sea-water, they have an electric action upon each other, becoming on the one part positively, and on the other negatively, electrified; the effect of which is destructive of the positive metal. This has been too little regarded in the sheathing of vessels.*

The various metals and alloys employed in the building and sheathing of a ship, almost always stand in this electric relation of positive and negative to each other; and if, as generally is the case, the copper sheathing is the positive metal, it will be destroyed with a rapidity proportionate to the degree in which the electric action is excited.

The sheathing-nails in common use are prepared of metals in very various proportions, regard being chiefly

* At this very time, an experiment is making in France by sheathing one half of a ship's bottom with *cuivre bronzé*, a metal negative to copper, and the other half with copper, the metals being in contact. It is easy to foresee that the positive metal, the copper, will lose more by corrosion than the negative metal, and thus give an apparent, but deceptive advantage to the *cuivre bronzé*. In one such an experiment already tried, the results of which have been published, the copper had, in fact, sustained more than what would be its *average* loss when not connected with the *cuivre bronzé*. In all experiments on new metallic sheathings there should be no *metallic* communication between the metal to be tried and any other.

had to their colour and tenacity; and an examination of several specimens has proved them to be as various in their electric relations with copper, as in their composition. They are generally negative to the copper, and, consequently, promote its corrosion. Numerous experiments have proved that the galvanic action, induced by the contact of such metals, is necessarily destructive of the positive metal; and they satisfactorily explain the irregular duration, and frequently rapid destruction, of the copper sheathing, which is often erroneously ascribed solely to impurity in the copper. If the sheathing of vessels returned from a voyage be examined, the hollows made by the heads of the nails will generally be found filled with crystals of the salts of copper, and the copper itself often completely corroded through. In an experiment, where copper obtained from *H. M.*'s dock-yard was employed, and to avoid all error, each sheet was divided in half, one-half being nailed to a board with pure copper nails, and the other with different samples of the nails in actual use at different dock-yards: after ten weeks' immersion in the sea at Portsmouth harbour, one half-sheet had lost two hundred and ninety-three grains more than its fellow, a second had lost thirty-two grains more than its fellow, and a third had lost twenty grains more than its fellow half-sheet; but one with nails prepared on the principles recommended in this paper, had lost thirty-four grains *less* than its fellow half-sheet. It is fair to presume that, if sheathing-nails similar to the samples had been used with the same copper on a ship, the duration of the sheathing would have been in somewhat the same proportion.

Copper possesses great advantages over the various alloys introduced for sheathing, from its flexibility and

toughness, by which it can be applied with facility, and yields to the strain of the vessel, while by the slow solution of its surface it very considerably diminishes the foulness from attachment of marine vegetables and animals. The chief objections to it are its expense—the liability to corrosion, and consequent irregularity and uncertainty of its duration—and its being too soft to be used for nails without an admixture of such other metals, as generally render them negative to, and destructive of, the copper. But it is equally an objection to the other metals and alloys, that they cannot at the same time be sufficiently soft for sheathing, and yet hard enough to drive as nails. These disadvantages may, however, be almost entirely obviated by the plan now proposed.

First, by the use of sheathing-nails that shall be compounded of such metals, in such proportions, as are known not to exercise any destructive agency upon the sheathing, but, on the contrary, have a tendency to preserve it.

Secondly, by attaching to the sheathing a metal positive to it, which, while itself in the process of being destroyed, shall preserve the sheathing from corrosion. For it is evident that if when several metals are placed in communication with each other, the most positive will be destroyed, and the others preserved, the application to the sheathing of a more positive metal or compound will thus be a protection to it. It is also obvious that the positive metal may easily be so applied, as that its destruction shall in no degree impair the strength of the vessel, or render necessary any general or expensive repairs.

Upon this principle (the correctness of which he fully established) Sir Humphry Davy applied masses of zinc or of iron, of different proportionate surfaces, to

the copper to be protected. The result was, that a very strong electric action was excited, and the corrosion and waste of the copper almost entirely prevented. But he found the electric energy so intense, if the protecting metal was in a large proportion, that the copper, by the decomposition of the sea-water, very speedily became covered with an earthy accretion, to which animals and plants adhered; and the sheathing became so foul as materially to impede the ship's progress. On the other hand, if a small proportion of the protecting metal were employed, it was destroyed so rapidly that the duration of the protection was too short to be of any value. These difficulties induced him to abandon his experiments.

The difficulties which frustrated the attempts of that eminent philosopher have been completely removed by the employment of a compound metal, which differs much less from the copper in its electric relation than either iron or zinc. By the use of such a compound, in which the proportions of metals may be varied as required, a larger protecting mass may be employed, a more diffused and uniform electric action produced over the whole surface of the sheathing, and just that protection afforded which shall preserve it from corrosion without causing foulness.

The protecting metal should be attached upon the sheathing in a longitudinal belt or band, a few inches wide, according to the size of the vessel, from stem to stern, about the light water line; and in large vessels, an additional band should be attached to the keel. Being in the direction of the passage of the vessel through the water, it will not impede her sailing;—if destroyed, it will not injure the ship; and when necessary, it can be easily removed, and renewed, without disturbing the sheathing.

After repeated and most satisfactory experiments at Portsmouth, under the inspection of the officers of H. M.'s dock-yard, the Lords Commissioners of the Admiralty were pleased to direct that the sheathing of H. M.'s schooner Fair Rosamond should be protected on this plan, preparatory to her sailing for the coast of Africa, where she is now stationed. She was commissioned in May 1833, and sailed first to Oporto, and afterwards to Africa. No official report has yet been received; but in November 1833, her copper is stated, on undoubted authority, to have been clean and bright, and by subsequent accounts it is proved to have continued so, up to the end of March 1834.

On the whole, it has been proved that, by the adoption of the sheathing-nails and protectors, the duration of the copper will be very much extended, and rendered comparatively certain; that such instances of its rapid destruction, as now so frequently occur, will be entirely prevented; and that so far from the protectors being the cause of foulness, the sheathing will be preserved much more clean and bright than under ordinary circumstances.

Iron and other metals or alloys, exposed to sea-water or acids, whether as iron cables, sheathing, or any other form, may be preserved from rust or corrosion on the same principle.

## List of Patents

*Granted in Scotland from 26th March, 1834.*

To Samuel Hall, of Basford, in the county of Nottingham, cotton manufacturer, for an invention of certain improvements in steam-engines.—26th March.

To Samuel Slocum, of the New-road, St. Pancras, in the county of Middlesex, engineer, for an invention of improvements in machinery for making pins.—12th April.

— Samuel Slocum, of the New-road, St. Pancras, in the county of Middlesex, engineer, for an invention of a certain improvement or improvements in machinery for making nails.—12th April.

— James Jamieson Cordes, of Idol-lane, in the city of London, merchant, in consequence of a communication made to him by a late resident of the United States of America, now deceased, for an invention of a certain improvement or improvements in machinery for making rivets or screw blanks or bolts.—12th April.

— James Jamieson Cordes, of Idol-lane, in the city of London, merchant, in consequence of a communication made to him by a late resident of the United States of America, now deceased, of a certain improvement or improvements in machinery for making nails.—12th April.

— Charles Attwood, of Whickham, near Gateshead, in the county of Durham, manufacturer of soda, for an invention of a certain pigment or certain pigments, by a certain process or certain processes not previously used for such purposes.—16th April.

— John Read, of Regent-street, in the county of Middlesex, merchant, and John Barton, of Providence-row, Finsbury, in the same county, engineer, for an invention of certain improvements in machinery or apparatus for raising and forcing fluids.—24th April.

— Hooton Deverill, of Manchester, in the county of Lancaster, for an invention of a method of engraving and etching on cylindrical surfaces for printing and other purposes.—30th April.

— John Christophers, of New Broad-street, in the city of London, merchant, for an invention of an improvement or improvements on anchors.—30th April.

— Miles Berry, of 66, Chancery-lane, in the parish of St. Andrew, Holborn, in the county of Middlesex, civil engineer

and patent agent, in consequence of a communication from a foreigner residing abroad, of an invention for certain improvements in the construction of weighing machines.—7th May.

To Thomas John Fuller, of the Commercial-road, in the county of Middlesex, civil engineer, for an invention of an improvement in the shape or form of nails, spikes, and bolts.—16th May.

— Thomas John Fuller, of the Commercial-road, in the county of Middlesex, civil engineer, for an invention of an improvement or improvements in machinery or apparatus for making or manufacturing of nails.—16th May.

— Janet Taylor, of East-street, Red Lion-square, in the county of Middlesex, for an invention of improvements in instruments for measuring angles and distances applicable to nautical and other purposes.—20th May.

— George Washington Wildes, of Coleman-street, in the city of London, merchant, in consequence of a communication made to him by a certain foreigner resident abroad, of an invention for certain improvements in machinery for cutting marble and other stones, and cutting or forming mouldings or groovings thereon.—20th May.

— John Paterson Reid, of the city of Glasgow, merchant and power-loom manufacturer, and Thomas Johnson, of the said city of Glasgow, mechanic, in the employment of John and Archibald Reid, of the said city of Glasgow, power-loom manufacturers, for an invention of certain improvements applicable to certain looms for weaving different sorts of cloth.—20th May.

— Benjamin Dobson, of Bolton-le-Moors, in the county of Lancaster, machinist, and John Sutcliffe and Richard Threlfall, both of the same place, mechanics, for an invention of certain improvements in machinery for roving and spinning cotton and other fibrous materials.—26th May.

## New Patents

## SEALED IN ENGLAND,

## 1834.

To Cornelius Tongue, of Gatacre Park, in the county of Salop, Esq., for his invention of certain improvements in apparatus for preventing accidents to traveling carriages of various descriptions.—Sealed 25th September—6 months for inrolment.

To Jean Baptiste Mollerat, now residing with Sir John Byerley, at Whitehead's-grove, in the parish of St. Luke, Chelsea, in the county of Middlesex, manufacturing chemist, for his invention of certain improvements in the manufacture of gas for illumination.—Sealed 25th September—6 months for inrolment.

To Richary Witty, of Hanley, in the county of Stafford, civil engineer, for his invention of an improvement or improvements in saving fuel and burning smoke applicable to furnaces and stoves.—Sealed 25th September—6 months for inrolment.

To Joseph Saxton, of Sussex-street, in the county of Middlesex, mechanician, for his invention of improvements in printing-presses, and in presses for certain other purposes.—Sealed 25th September—6 months for inrolment.

To Samuel Draper, of Radford, in the county of Nottingham, lace-maker, for his invention of an improved manufacture of figured bobbin-net, or what is commonly called bobbin-net lace.—Sealed 25th September—6 months for inrolment.

To James Gardner, of Banbury, in the county of Oxford, ironmonger, for his invention of certain im-

provements on machines for cutting Swedish and other turnips, mangel wurzel, and other roots, used as food for sheep, horned cattle, and other animals.—Sealed 25th September—6 months for inrolment.

To Joseph Clisild Daniell, of Twerton Mills, near Bath, in the county of Somerset, clothier, for his invention of an improvement or improvements in the process of manufacturing or preparing woollen cloth.—Sealed 25th September—6 months for inrolment.

To Richard Freen Martin, of Hercules-buildings, Lambeth, in the county of Surrey, gentleman, for his invention of a certain process or processes, method or methods, of combining various materials so as to form stuccoes, plaisters, or cements, and for the manufacture of artificial stones, marbles, and other like substances, used in buildings, decorations, or similar purposes.—Sealed 8th October—6 months for inrolment.

To James Jamieson Cordes, of Idol-lane, in the city of London, merchant, for a certain improvement or improvements in machinery for making nails, being a communication from a foreigner residing abroad.—Sealed 8th October—6 months for inrolment.

To James Jamieson Cordes, of Idol-lane, in the city of London, merchant, for a certain improvement or improvements in machinery for making rivets and screw blanks or bolts, being a communication from a foreigner residing abroad.—Sealed 8th October—6 months for inrolment.

To Benjamin Hick, of Bolton-le-Moors, in the county palatine of Lancaster, engineer, for his invention of certain improvements in locomotive steam-carriages, parts of which improvements are applicable to ordinary carriages, and to steam-engines employed for other uses.—Sealed 8th October—6 months for inrolment.

To Thomas Sharp, of Manchester, in the county palatine of Lancaster, and Richard Roberts, of the same place, engineers, for certain improvements in machinery for spinning and doubling cotton, silk, flax, and other fibrous materials, being a communication from a foreigner residing abroad.—Sealed 8th October —6 months for inrolment.

To John Ericsson, of Union-wharf, Albany-street, Regent's-park, in the county of Middlesex, engineer, for his invention of certain improved machinery applicable for propelling vessels.—Sealed 10th October—6 months for inrolment.

To Richard Elkington, of Birmingham, in the county of Warwick, optician, for his invention of an improvement or improvements in the constructing, making, or manufacturing of spectacles.—Sealed 10th October—6 months for inrolment.

To Thomas Serle, of Coleman-street, in the city of London, merchant, for certain improvements in boilers for generating steam, being a communication from a foreigner residing abroad.—Sealed 11th October—6 months for inrolment.

To Lord Baron Audley, of Releigh Castle, in the county of Stafford, for his invention of an apparatus or machine as a substitute for, or to be attached to, locks or other fastenings, which he denominates a lock-protector.—Sealed 11th October—6 months for inrolment.

To Samuel Seaward, of the parish of All Saints, Poplar, in the county of Middlesex, engineer, for his invention of certain improvements in the construction of steam-engines.—Sealed 17th October—6 months for inrolment.

To Claude Marie Hilaire Molinard, of Brewer-street,

Golden-square, in the county of Middlesex, merchant, for a certain improvement in looms or machinery for weaving fabrics, being a communication from a foreigner residing abroad.—Sealed 17th October—6 months for inrolment.

To George Littlewort, of Rahere-street, Goswell-road, in the county of Middlesex, watch and clock maker, for his invention of certain improvements on watches and clocks.—Sealed 17th October—6 months for inrolment.

To Malcolm M'Gregor, of Manchester, in the county of Lancaster, manufacturer, for his invention of certain improvements in machinery for slubbing, roving, spinning, twisting, and doubling cotton and other fibrous materials.—Sealed 20th October—6 months for inrolment.

To James Jones, of Salford, in the parish of Manchester, in the county of Lancaster, machine-maker, for his invention of certain improvements for making rovings, spinning and doubling of cotton, silk, flax, and other fibrous substances. —Sealed 20th October—6 months for inrolment.

To Manoah Bower, of Birmingham, in the county of Warwick, manufacturer, and George Blyth, of the same place, merchant, for their invention of certain improvements on or addition to saddles for horses.—Sealed 22d October—6 months for inrolment.

To Jean Baptiste Reney, of Panton-square, in the county of Middlesex, brick-maker, for certain improved machinery for manufacturing articles out of brick and other the like earth, being a communication from a foreigner residing abroa —Sealed 22d October—6 months for inrolment.

To James and John Hartley, of West Bromwich, near Birmingham, glass-manufacturers, for their invention of a certain improvement or certain improvements in the manufacture of glass.—Sealed 22d October—6 months for inrolment.

To John Stanley and John Walmsley, both of Manchester, mechanics, for their invention of certain improvements on grates or apparatus applicable to steam-engines or other purposes, and in apparatus for feeding the same with fuel; which apparatus, conjointly or separately, may be applied to other purposes.—Sealed 22d October—6 months for inrolment.

To Amassa Stone, of Johnstone, in the county of Providence and State of Rhode Island, in the United States of America, machinist, now residing at Liverpool, in the county of Lancaster, for his invention of an improvement on power and other looms, and in the weaving of silk, hempen, cotton, woollen, and other cloth.—Sealed 22d October—6 months for inrolment.

To George Daniel Carey, of Basford, in the county of Nottingham, hat-manufacturer, for his invention of certain machinery or apparatus to be employed in the manufacture of hats —Sealed 22d October—6 months for inrolment.

## CELESTIAL PHENOMENA, FOR NOVEMBER, 1834.

| D. | H. | M. | |
|---|---|---|---|
| 1 | | | Clock after the ☉ 16 m. 15 s. |
| | — | | ☽ passes the mer. noon. |
| | 9 | 16 | ♃'s first sat. will im. |
| | 16 | 39 | ♅ stationary. |
| | 17 | 59 | ☿ greatest hel. lat. S. |
| 2 | 4 | 54 | ☿ greatest elong. 23 26 E. |
| | 10 | 27 | ☿ in conj. with the ☾ diff. of dec. 4. 16. S. |
| 4 | 0 | 39 | ♀ in conj. with the ☾ diff. of dec. 3. 44. S. |
| 5 | | | Clock after the ☉ 16 m. 15 s. |
| | — | | ☽ passes the mer. 3 h. 52 m. |
| 6 | 16 | 42 | ♃'s first sat. will im. |
| 7 | 18 | 30 | ☽ in □ or first quarter. |
| 8 | | | Mer. R. A. 16 h. 22 m. dec. 24. 16. S. |
| | — | | Ven. R. A. 17 h. 53 m. dec. 27. 49. S. |
| | — | | Mars R. A. 7 h. 28 m. dec. 23. 29. N. |
| | — | | Vesta R. A. 4 h. 1 m. dec. 11. 51. N. |
| | — | | Juno R. A. 19 h. 49 m. dec. 14. 13. S. |
| | — | | Pallas R. A. 14 h. 29 m. dec. 2. 42. N. |
| | — | | Ceres R. A. 14 h. 24 m. dec 8. 13. S. |
| | — | | Jup. R. A. 4 h. 31 m. dec. 20. 59. N. |
| | — | | Sat. R. A. 13 h. 8 m. dec 4. 49. S. |
| | — | | Georg. R. A. 21 h. 41 m. dec. 14. 40. S. |
| | — | | ☿ passes the mer. 1 h. 13 m. |
| | — | | ♀ passes the mer. 2 h. 44 m. |
| | — | | ♂ passes the mer. 16 h. 16 m. |
| | — | | ♃ passes the mer. 13 h. 20 m. |
| | 5 | 49 | ♅ in conj. with the ☾ diff. of dec. 4. 9. N. |
| | 11 | 10 | ♃'s first sat. will im. |
| | 17 | 42 | ♃'s second sat. will im. |
| 10 | | | Clock after the ☉ 15 m. 55 s. |
| | — | | ☽ passes the mer. 8 h. 2 m. |
| 12 | 7 | | ♃'s second sat. will im. |
| | 17 | 3 | ☿ stationary. |
| 13 | 18 | 36 | ♃'s first sat. will im. |
| 15 | | | Clock after the ☉ 15 m. 15 s. |
| | — | | ☽ passes the mer. 11 h. 27 m. |
| | 13 | 4 | ♃'s first sat. will im. |
| | 15 | | ♀ at greatest brilliancy. |
| | 22 | 48 | Ecliptic oppo. or ○ full moon. |
| 17 | 3 | 42 | ♃ in conj. with the ☾ diff. of dec. 0. 2. S. |
| 17 | 7 | 33 | ♃'s first sat. will im. |
| 19 | 17 | 42 | Vesta in oppo. to the ☉ |
| 20 | | | Clock after the ☉ 14 m. 33 s. |
| | — | | ☽ passes the mer. 15 h. 37 m. |
| | 14 | 58 | ♂ in conj. with the ☽ diff. of dec. 0. 52. S. |
| | 17 | 20 | ☿ in the ascending node. |
| 22 | 14 | 59 | ♃'s first sat. will im. |
| 23 | 20 | | ☿ in inf. conj. with the ☉ |
| | 8 | 7 | ♂ stationary. |
| | 15 | 36 | ☾ in □ or last quarter. |
| 24 | | | Mer. R. A. 15 h. 50 m. dec. 19. 1. S. |
| | — | | Ven. R. A. 18 h. 28 m. dec. 26. 43. S. |
| | — | | Mars R. A. 7 h. 35 m. dec. 23. 57 N. |
| | — | | Vesta R. A. 3 h. 44 m. dec. 11. 24. N. |
| | — | | Juno R. A. 20 h. 11 m. dec. 14. 14. S. |
| | — | | Pallas R. A. 14 h. 56 m. dec. 2. 5. N. |
| | — | | Ceres R. A. 14 h. 51 m. dec. 10. 37. S. |
| | — | | Jup. R. A. 4 h. 22 m. dec. 20. 41. N. |
| | — | | Sat. R. A. 13 h. 15 m. dec. 5. 26. S. |
| | — | | Georg. R. A. 21 h. 42 m. dec. 14. 37. S. |
| | — | | ☿ passes the mer. 23 h. 30 m. |
| | — | | ♀ passes the mer. 2 h. 15 m. |
| | — | | ♂ passes the mer. 15 h. 20 m. |
| | — | | ♃ passes the mer. 12 h. 6 m. |
| | 9 | 27 | ♃'s first sat. will im. |
| 25 | | | Clock after the ☉ 12 m. 52 s. |
| | — | | ☽ passes the mer. 19 h. 57 m. |
| | 6 | 41 | ☿ in Perihelion. |
| | 9 | 25 | ♃'s third sat. will im. |
| 26 | 10 | | ♂ in conj. with κ in Geminor, diff. of dec. 0. 43. N. |
| | 12 | 42 | ♃'s second sat. will im. |
| | 23 | 3 | ♄ in conj. with the ☽ diff. of dec. 2. 23. S. |
| 27 | | | Occul. 95 Virginis, im. 16 h. 12 m. em. 17 h. 6 m. |
| 28 | 18 | 43 | ♃ in oppo. with the ☉ |
| 29 | 8 | 7 | ☿ in conj. with the ☽ diff. of dec. 0. 17. N. |
| 30 | | | ☉ eclip. invisible at London. |
| | 1 | | ♃ in conj. with ε in Tauri |
| | 6 | 47 | Ecliptic conj. or ● new moon. |
| | 16 | 4 | ♀ Stationary. |

J. LEWTHWAITE, Rotherhithe.

# METEOROLOGICAL JOURNAL,

## FOR SEPTEMBER AND OCTOBER, 1834.

| 1834. | Thermo. | | Barometer. | | Rain in inches | 1834. | Thermo | | Barometer. | | Rain in inches |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hig. | Low | High | Low | | | Hig | Low | High. | Low. | |
| Sept. | | | | | | Oct. | | | | | |
| 26 | 64 | 51 | 30,04 | 29,92 | | 11 | 65 | 33 | 29,97 | 29,91 | |
| 27 | 68 | 50 | 29,86 | 29,83 | ,175 | 12 | 63 | 39 | 30,05 | 30,03 | |
| 28 | 67 | 51 | 30,05 | 29,95 | ,075 | 13 | 65 | 40 | 30,04 | 30,00 | |
| 29 | 65 | 47 | 30,18 | 30,14 | | 14 | 65 | 45 | 29,90 | 29,79 | |
| 30 | 63 | 41 | 30,11 | 30,07 | | 15 | 62 | 37 | 29,69 | 29,65 | ,05 |
| Oct. | | | | | | 16 | 61 | 39 | 29,35 | 29,26 | |
| 1 | 62 | 44 | 30,09 | 30,05 | | 17 | 58 | 41 | 29,59 | 29,99 | ,2 |
| 2 | 64 | 36 | 30,09 | 30,05 | | 18 | 55 | 35 | 29,90 | 29,80 | ,075 |
| 3 | 62 | 35 | 30,08 | 30,06 | | 19 | 57 | 36 | 29,91 | 29,83 | ,025 |
| 4 | 62 | 37 | 30,12 | 30,08 | | 20 | 61 | 54 | 29,73 | 29,70 | ,025 |
| 5 | 68 | 35 | 30,14 | 30,10 | | 21 | 56 | 50 | 30,14 | 29,95 | ,025 |
| 6 | 74 | 41 | 30,14 | Staty. | | 22 | 58 | 36 | 29,92 | 29,76 | |
| 7 | 70 | 43 | 30,13 | 30,11 | | 23 | 58 | 51 | 29,61 | 29,56 | ,05 |
| 8 | 65 | 51 | 30,11 | 30,05 | | 24 | 50 | 32 | 29 80 | 29,65 | ,025 |
| 9 | 66 | 57 | 29,92 | 29,80 | | 25 | 55 | 37 | 30,14 | 30,00 | |
| 10 | 65 | 41 | 29,82 | 29,77 | | | | | | | |

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

# List of Patents

*That have passed the Great Seal in Ireland from the beginning of the Year* 1820 *to* 1830.

1820.

To Francis Fox, the younger, for a new improved method of facilitating and ensuring the discharge of fire-arms.—12th January.

— Israel Grundy and Edward and Josiah Neave, for an application of various gases to certain useful purposes.—12th April.

— William Brockedon, for an invention of certain improvements in wire-drawing.—12th April.

— William Mallett, for his invention of a lock with sliding guards.—23d May.

— James Bristow Frazer and George Lilly, for improvements in propelling boats and other vessels.—9th August.

— William Kendrick, for improvements in tanning hides.—14th August,

— Samuel Fletcher, for improvements in saddles.—14th August.

— John Rider, for improvements in steam-engines.—17th August.

— Apsley Pellatt, for incrusting devices in glass.—24th August.

— Honourable William Erskine Cochrane, for improvements in the construction of lamps.—9th September.

— Robert Frith, for an invention of dyeing and printing colours on linen, calico, &c., so as to make the same permanent.—10th December.

1821.

— William Bruntin, for certain improvements in fire-grates.—10th March.

— Joseph Main, for improvements in preparing and spinning wool, cotton, silk, flax, &c.—23d March.

— Ilario Pellafinet, for an improvement of machinery for breaking, bleaching, preparing, and spinning yarn, hemp, flax, &c.—18th April.

— William Frederick Collard, for an improvement in piano-fortes.—4th May.

To John Winter, for an improvement in chimney tops.—11th March.

— Phillips London, junior, for an improvement in the application of heat to coppers and other utensils.—22d May.

— John Leigh Bradbury, for a new method of engraving and etching metal rollers used for printing, &c.—15th June.

— Samuel Hall, for an improvement in the manufacture of starch.—6th August,

— Robert Salmon, for an improvement in the construction of instruments for the relief of hernia and prolapsis.—6th August.

— John Lethbridge, for a new and improved method of obtaining gas from oil, &c.—31st October.

— Marquis of Chabannes, for a new mode of attracting and catching fish.—8th November.

1822.

— Thomas Masterman, for machinery to be moved by steam without cylinder, piston, &c.—26th January.

— Thomas Morton, for a method of dragging ships out of water on land.—1st February.

— Henry Robinson Palmer, for improvements in the construction of railways or tram-roads, and of the carriages to be used thereon.—1st February.

— Dominique Pierre Deurbrocq, for an apparatus for condensing the alcoholic steams arising from spirituous liquors.—26th June.

— John Poole, for improvements in plating iron or steel with brass, copper, &c.—26th June.

— William Erskine Cochrane, for improvements in the construction of lamps.—26th June.

— Pierre Erard, for improvements on the pedal harp.—18th October.

— Richard Ormrod, for improvements in the mode of heating liquors in boilers.—18th October.

— Pierre Erard, for improvements in piano-fortes and other keyed instruments.—14th December.

1823.

— William Cleland, for an improved apparatus for evaporating liquors.—January.

To Sir Anthony Perrier, for an apparatus for distilling.—15th February.

— John Barlow, for improvements in the manufacture of gas, but particularly from peat or turf.

— James Fox, for improvements in apparatus for distillation.—6th June.

— Jacob Perkins, for improvements in steam-engines.—6th June.

— William Lister, for improvements in spinning wool, silk, mohair, &c.—6th June.

— Robert Winter, for an improved method of conducting the process of distillation.—1st August.

— Joseph Woollams, for an improvement in wheeled carriages.—1st August.

— Robert Mushett, for an improvement in copper for sheathing of ships.—1st August.

— Philip Chell, for improvements in drawing and roving and spinning hemp, flax, &c.—7th August.

— Charles Mackintosh, for rendering flax, wool, cotton, silk, leather, &c., impervious to water.—15th August.

— John Leigh Bradbury, for improvements in printing, painting, and staining silks, cottons, &c.—27th September.

— William Wigston, for improvements in steam-engines.—5th December.

— John Greene, for improvements in machines for roving and spinning cotton, flax, silk, and other fibrous substances.—5th December.

— Samuel Hall, for improvements in lace, net, muslin, &c.—8th December.

— Richard Roberts, for improvements in machines for weaving plain and figured cloths.—12th December.

— Joseph Rogerson Cotter, for improvements on musical instruments.—24th December.

1824.

— Thomas Bewley, for improvements in wheeled carriages.—5th February.

To Louis John Pouché, for improvements in casting and making metal type.—19th February.

— Charles Anthony Dean, for an apparatus for extinguishing fire or extricating property therefrom.—25th February.

— John Foster Gimson, for improvements in doubling and twisting cotton, silk, &c.—25th February.

— William Furnival and Alexander Smith, for an improved boiler for steam-engines and other purposes.—19th April.

— Francis Gybbon Spilsbury, for improvements in farming.—29th April.

— John Malam, for improvements in gas apparatus.—29th June.

— Jean Jacques Saintmaire, for improvements in distilling.—10th July.

— Thomas Gethan, for improvements in metallic plates, rollers, pipes, &c.—12th July.

— Daniel Tonge, for improvements in reefing sails.—12th July.

— John Crossby, for improvements in the construction of lamps and lanterns, for the better prevention of light against wind.—August.

— John Viney, for improvements in water-closets.—27th Sept.

— Jephtha Avery Wilkinson, for improvements for manufacturing weavers' reeds by water and other power.—2d October.

— Robert Lloyd and James Rowbotham, for improvements in hats.—2d October.

— John George Bodmer, for improvements in cleansing, carding, &c., cotton.—7th October.

— George Vaughan, for improvements in steam-engines.—7th October.

— James Easton, for a machine for breaking, scutching, and preparing flax, &c.—5th November.

1825.

— William Busk, for improvements in propelling ships' boats, &c.—7th March.

— Josiah Parks, for a certain method of manufacturing salt.—7th March.

To Pierre Jean B. V. Gosset, for improvements in looms for weaving.—22d March.

— John Heathcoat, for improvements in manufacturing silk for weaving.—22d March.

— William Weston Young, for improvements in the manufacture of salt.—30th March.

— John Bellingham, for improvements in the use of gas for illumination.—16th April.

— Thomas Masterman, for an apparatus for bottling wine, beer, &c.—16th April.

— John Masterman, for an improved method of corking bottles.—15th April.

— John Phipps and Christopher Phipps, for improvements in machinery for making paper.—16th April.

— David Gordon, for improvements in the construction of portable gas lamps.—2d May.

— James Hanmer Baker, for improvements in the art of dyeing and calico printing.—16th May.

— William Furnival, for improvements in the manufacture of salt.—16th May.

— James Surrey, for a new method of applying heat for the production of steam.—20th April.

— John Potter, for improvements in looms to be impelled by mechanical power.—14th June.

— Charles Mackintosh, for a new process in making steel.—14th June.

— Abraham Henry Chambers, for improvements in paving horse and carriage ways.—18th June.

— Simeon Broadmeadow, for improvements in manufacturing and purifying inflammable gas, by the introduction of atmospheric air.—18th June.

— Samuel Browne, for an engine for effecting a vacuum for raising water, and for putting machinery in motion.—18th June.

— William Chell, for improvements in drawing, roving, and spinning flax, wools, &c.—18th June.

To William Harrington, for an improved raft for transferring timber.—20th June.

— Richard Badnall, for improvements in winding, doubling, &c. silk, wool, cotton, &c.—20th June.

— George Augustus Lamb, LL.D., for a new composition of malt hops.—30th June.

— John Leigh Bradbury, for a new mode of twisting, spinning, or throwing silk, cotton, &c.—1st July.

— Charles Ogilvy, for an apparatus for storing gas.—15th July.

— Benjamin Rotch, for an improved fid for upper masts of ships' vessels, &c.—22d July.

— Cornelius Whitehouse, for improvements in manufacturing tubes for gas, &c.—6th August.

—Timothy Burstall and John Hill, for a locomotive or steam carriage.—16th August.

— Walter Hancock, for improvements in pipes or tubes for the passage of fluids.—16th August.

— William Grimble, for improvements in the construction of an apparatus for distilling of spirituous liquors.—20th August.

— James Tullock, for improvements in machinery for sawing marble.—7th September.

— Ralph Cordner, for the combination of an apparatus for washing and bleaching by steam, with other agents.—7th September.

— John Charles Christopher Raddatz, for improvements in, or connected with steam-engines.—23d September.

— William Mason, for improvements in axle-trees.—23d September.

— Edmond Jordin, for a new mode of obtaining power applicable to machinery.—30th September.

— Maurice de Jongh, for improvements in spinning machines.—30th September.

— Richard Roberts, for improvements in machinery for spinning.—30th September.

— Thomas Dwyer, for improvements in the manufacture of buttons.—10th October.

— John Wilks and John Ecroyd, for an engine for cutting nails, sprigs, and sparables.—1st November.

To George Hunter, for improvements in the construction and application of wheels.—22d November.

— John Martin Hanchett and Joseph Delvale, for improvements in looms.—25th November.

— Benjamin Sanders, for improvements in constructing or making buttons.—29th December.

1826.

— John Bowler and Thomas Gibson, for an improvement in the manufacture of hats.—17th January.

— James Bythe Waynman, for improvements in the manufacture of hat borders.—9th February.

— George Thompson, for improvements in the construction of riding saddles.—11th February.

— Thomas Steel, for improvements in the construction of diving bells.—24th February.

— Alexander Lamb and William Suttell, for improvements in machinery for preparing, roving, drawing, &c., flax, hemp, silk, &c.—22d March.

— John Harvey Sadler, for an improved power loom for weaving silk, cotton, &c.—22d March.

— Jean Jacques Saintmaire, for improvements in the process of distilling.—22d March.

— John Frederick Smith, for improvements in machinery for cording, roving, drawing, &c., wool, cotton, &c.—22d March.

— Henry Holdsworth, junior, for improvements in winding bobbins, &c.—22d March.

— Francis Molineux, for improvements in machinery for spinning and twisting silk, wool, &c—.20th May.

— Nicholas Hegesippi Maniclor, for a new preparation of fatty substance for the purpose of affording light.—30th May.

— John Stephen Langton, for a new mode of seasoning timber and other wood.—14th June.

— Joseph Alexander Taylor, for a new polishing apparatus for household purposes.—18th July.

— Timothy Burstall and John Hill, for a locomotive steam-engine.—31st August.

To Marquis de Combio, for improvements in the construction of rotatory steam-engines.—4th September.

— Thomas Cooke, for improvements in the construction of carriages and on harness to be used therewith, whereby greater safety to the persons riding in such carriages and other advantages will be obtained.—4th September.

— Edmund Luscombe, for a method of manufacturing or preparing an oil or oils extracted from certain vegetable substances, and the application thereof to gas light and other purposes.—4th September.

— Richard Mee Raikes, for a method of applying steam without pressure to pans, boilers, coppers, stills, pipes, and machinery, in order to produce, transmit, and regulate various temperatures of heat in the several processes of boiling, distilling, evaporating, inspissating, drying, and warming, and also to produce power.—7th November.

— Samuel Browne, for certain improvements on his former patent for an engine or instrument for effecting a vacuum, and thus producing a power by which water may be raised and machinery put in motion.—8th December.

— James Kay, for improvements for spinning hemp, &c.—9th December.

1827.

— Theodore Jones, for an improvement or improvements on wheels for carriages.—8th January.

— John Oldham, for certain improvements in the construction of wheels designed for driving machinery, which are to be impelled by water or by wind, and which said improvements are also applicable to propelling boats and other vessels.—2d April.

— John Frederick Daniel, for certain improvements in the manufacture of gas for the purposes of illumination.—1st May.

— Henry Charles Lacy, for a new apparatus on which to suspend carriage bodies.—1st May.

— Dominique Pierre Deurbrocq, for an apparatus adapted to cool worts or must, previous to its being sent to undergo the process of fermentation, and also for the purpose of condensing the steam arising from stills during the process of distillation.—7th May.

To William Mallett, for portable iron beds.—21st May.

— John Pollock, for a method of manufacturing gas, fit for illuminating purposes from rosin, and producing a residuum, from which spirits of turpentine and pitch are extracted.—2nd June.

— William Nicholson and Charles Barwell Coles, for a new method of constructing gasometers or machines, or apparatus, for holding and distributing gas for the purpose of illumination. —16th June.

— Robert Stirling and James Stirling, for certain improvements in air-engines for the moving of machinery.—20th June.

— Morton William Laurence, for an improvement in the process of refining sugar.—24th June.

— Francis Halliday, for certain improvements on engines or machinery, to be actuated by steam; which improvements, with or without the aid of steam, are applicable to the raising or forcing of water.—24th June.

— William Wilmot Hall, for an engine for moving and propelling ships, boats, carriages, mills, and machinery of every kind.—11th July.

— Robert Moore, for certain improvements in the process of preparing and cooling worts or wash from vegetable substances for the production of spirits.—13th September.

— Robert Moore, for certain processes for rendering distillery refuse productive of spirits.—13th September.

— John Patterson Reid, for an improvement or improvements on power-looms for weaving cloth of various kinds.—21st Sept.

— Walter Hancock, for an improvement or improvements upon steam-engines.—23d October.

— Joseph Tilt, for certain improvements in the boilers used for making salt, commonly called salt-pans, and in the mode of applying heat to the brine.—10th December.

— Solomon Robinson, for improvements in machinery for hackling or dressing and cleaning hemp, flax, and tow.—10th December.

— Lambert Dexter, for certain improvements in machinery for the purpose of spinning wool, cotton, and other fibrous substances.—10th December.

1828.

To Count de la Garde, for improvements in machinery for breaking or preparing hemp, flax, and other fibrous materials, which he denominates "The Rural Mechanical Brake."—4th January.

— Bennet Woodcroft, for certain processes and apparatus for printing and preparing for manufacture yarns of linen, cotton, silk, woollen, or any other fibrous material.—11th February.

— Thomas Bonnor, for certain improvements on safety-lamps.—29th February.

— Peter Humphrys, for an apparatus or mode for the saving of fuel in the boiling and heating of liquids.—3d April.

— Robert Stein, for an improvement in applying heat to the purpose of distillation.—22d July.

— John Bayley Hammet, for certain improvements in four-wheeled carriages in a new application of springs above or below the axle-trees, and has invented a newly-constructed hindermost and fore-carriage.—22d July.

— Sir James Anderson and William Henry James, for certain improvements in the construction of steam-carriages, and in the apparatus or machinery for propelling the said carriages; part of which improvements are applicable to other useful purposes.—22d July.

— Mathew Bush, for certain improvements on the machinery or apparatus for printing calicoes and other fabrics.—22d July.

— Joshua Jenour, junior, for a cartridge or case, and method of more advantageously enclosing therein shot or other missiles for the purpose of loading fire-arms and guns of different descriptions.—25th August.

— James Beaumont Neilson, for an invention of the improved application of air to produce heat in fires, forges, and furnaces, where bellows or other blowing apparatus are required.—22d December.

1829.

— William Strachan, for an improvement in the making or manufacture of alum.—24th March.

— Count de la Garde, for a method of making paper of various

descriptions from the bullen or ligneous part produced from certain textile plants, and in the process of preparing the same textile plants by the rural mechanical brake, and which substances are to be employed alone or mixed with other suitable materials in the manufacture of paper.—24th March.

To Granville Sharp Pattison, for a new and improved method of applying iron in the sheathing of ships and other vessels, and of applying iron bolts, spikes, nails, pintles, braces, and other fastenings, used in the construction of ships and other vessels.—8th April.

— Maurice de Jongh, for an improvement or improvements in machines, adapted for spinning, doubling, twisting, roving, and preparing cotton and other fibrous substances.—25th May.

— Samuel Hall, for a method and apparatus for generating steam and various gases to produce motive power, and for other useful purposes.—8th July.

— John Lihou, for an improved method of constructing ships' pintles for hanging the rudder.—18th August.

— Joshua Bates, for a new process or method for whitening sugars.—18th December.

— Joshua Bates, for an improved method of constructing steam-boilers or generators, whereby the bulk of the boilers or generators and consumption of fuel are considerably reduced.—18th December.

END OF VOL. IX.

THE

# London

## JOURNAL OF ARTS AND SCIENCES,

AND

## REPERTORY

OF

## PATENT INVENTIONS.

*CONJOINED SERIES.*

No. XXXII.

## Recent Patents.

*To* JAMES SMITH, *of Deanstone Works, in the parish of Kilmadoch, in the county of Perth, cotton spinner, for his invention of certain improvements in machinery used in the preparing and spinning of cotton, flax, wool, silk, and other fibrous materials.*—[Sealed 20th February, 1834.]

THIS invention consists in the construction and adaptation of certain arrangements of machinery to that particular kind of spinning machine called the mule, which arrangement and adaptation of machinery are also applicable to the preparation machine, known by the name of the stretcher, and to mules used for doubling or twisting two or more threads or rovings together, for the purpose of rendering these machines self-acting, or more independent of the attention required from the

operative or spinner; together with certain arrangements for the condensation of such machinery, so as to occupy less room or space on the floor, and the more economical application of the labour and attention required in superintending the same.

The manner in which this invention is to be performed and carried into effect, will be more clearly seen by reference to the annexed drawings (see plate X.); in all which plans, elevations, and sections of machinery, the same letters and figures of reference are used, denoting similar parts throughout the whole of the drawings.

The Patentee says,—Before I proceed to describe the annexed drawings, I shall endeavour to explain the nature of the various movements required in the machine called the mule, for the purpose of rendering the application of my improvement for effecting such movements better understood; and this explanation will render it unnecessary to give any description of the movements of the stretcher, from the great similarity of the two machines.

The peculiar arrangements of any particular machine may render it necessary to vary the position in which my improvements are applied; but such variations, together with the various speeds required, must depend on the nature of the machine to which my improvements are applied, and are well known to spinners and persons conversant with spinning machinery; and although in the following drawings I have delineated the whole of my improvements as applied to a mule of one construction, any one or more separate movement may be applied to mules already constructed, and the precise mode or manner of effecting such application must also depend on the build of the mule or stretcher to which it is to be applied.

Considering the action of the drawing rollers and the rotation of the spindles as common to all spinning machines, the mule may over and above those two movements be conveniently divided into five movements. First, "the coming out of the carriage," which commences at the same time as the delivery of the drawing rollers and the rotation of the spindles, and terminates at the end of what is called "the stretch," or the greatest distance which the carriage is allowed to recede from the drawing rollers. At this point the delivering rollers cease to move, while the spinning generally proceeds for a short time.

The second movement is the "backing off," which consists of reversing the rotation of the spindles, for the purpose of unwinding or removing the spiral coils of yarn which arrange themselves on the bare part of the spindles during the process of spinning, as shown at *a*, *a*, *a*, figs. 1, 2, and 3; which is generally done by the spinner reversing the rotation of the rim or driving pulley by hand.

The third movement is "putting down and guiding the faller wire," which is also generally done by hand, and is for the purpose of depressing or carrying the ends of yarn or thread, which have been perfected or spun during the last stretch or coming out of the carriage, down to the lower part of the spindles, and then, by its gradual elevation during the subsequent going in of the carriage, distributing the yarn on the spindles in the form of what is called a cop.

The fourth movement, or "winding on," proceeds during the going in of the carriage, and has generally been effected by the spinner moving the rim carefully by hand at a speed to "wind on," or place the yarn spun during the last stretch, on the various circumferences of the cop, at a uniform tension.

The fifth or last movement, or the "going in of the carriage," proceeds at the same time as the "winding on," and also generally depends on the operative in mules of the ordinary construction. The termination of the going in of the carriage and the winding on leaves the carriage up at the front rollers, and the machine in a position to recommence its operation in the succeeding stretch (always considering the movements which govern the rotation of the spindles and the drawing rollers), to be arranged so as to start and end their respective motions at the periods required, according to the nature of the spinning to be performed.

It will be remarked, that of the five movements before described, four are dependant on the spinner or operative in ordinary machines; and one object of my invention is, to render these movements independent of the spinners, and dependant on the moving power which turns the machine.

In spinning yarn on machines of this description, it is generally "wound on" or placed on the bare spindle, in the form of what is called a cop, as represented at its various stages towards completion, at figs. 1, 2, and 3, the nature and construction of which I shall now proceed to describe, for the purpose of rendering the movements for winding on or placing the yarn in this peculiar form better understood.

The commencement of building a cop takes place at the neck of the spindle, a short way above the bearing, as seen at fig. 1, to which point the thread is forced by the faller wire, as soon as the "backing off" or removal of the spirals *a*, *a*, *a*, is effected, and the gradual elevation of the faller during the going in of the carriage distributes the yarn over the surface of the cop in successive conical layers at every stretch or "winding on."

The form of the successive layers vary at every winding on, until the cop arrives at the stage represented at fig. 2, which is called the cop bottom; after which it consists of a succession of conical layers, similar in every respect, until the cop is completed, as indicated by the oblique lines in fig. 3, which represents a finished cop.

Having stated the nature of the various movements of the mule, together with a description of the cop which it is designed to construct, I shall proceed to describe, with reference to the annexed drawings, the manner in which I effect these movements, together with the condensation of the machinery, and means of economising the labour and attention of the operatives or hands required to superintend the operation of the machine.

Fig. 4, represents an elevation, and fig. 5, a plan of a pair of mules, arranged with the application of my improvements. In these figures, A represents the fast and loose pulleys for driving the machine in the ordinary manner; and A 2, the drawing rollers; B represents the rim, carrying two straps *b*, which convey motion to the pulley 1 *b* and 4 *b*, and thence to the drum-band pulley 2 *b*, which is placed on the same shaft, and through the drum-band 3 *b*, to the spindles in the usual manner. But as in this arrangement the same rim B drives both the mules, and the various movements being precisely similar in each, I shall only describe the right hand gearing.

In this arrangement of mules, the rim B, does not stop, as is generally the case, while the carriage is going in; but the strap *b*, is traversed on to the loose pulley 4 *b*, as soon as the spinning action is required to cease, which is effected by the projection C, from the carriage

coming in contact and forcing back the lever 1 C, which carries back the horizontal rod C, and actuates the strap-guider 1 C, which governs the position of the strap *b*, at the same time that it tightens the break Q, which, pressing on the pulley R, and stops the motion of the drum-band pulley.

In fig. 4, E represents the internal face of a mangle wheel, which receives motion from the pulley A, through the bevels placed on the horizontal shaft E 1, which imparting motion to the spur wheel F 1, and F 2, it is conveyed to the pinion *e*, (see fig. 5,) and thence to the mangle wheel E, which thereby reciprocates or varies the direction of its rotation, as the pinion *e*, vibrates from the external to the internal circumference of teeth, of which it is constructed.

Attached to the mangle wheel E, and partaking of the same motion, is the spur wheel F, which, gearing into the rack F 4, below, carries or traverses the carriage D, on which the rack is fixed, backward and forward at every revolution of the mangle wheel E; and the speeds of the going out and coming in of the carriage D, are regulated by the size and relative proportions of the internal and external circumferences of teeth of the mangle wheel E.

Thus supposing the carriage to have arrived at the end of a stretch or greatest distance from the front or delivering roller, and the spinning to have ceased, the backing off will be the next movement required; but I do not perform this by reversing the rotation of the spindles as in ordinary mules, but by the patent movements invented by John Robertson, of Crofthead, Renfrewshire, more particularly described in his specification to his patents,* which consists in elevating the

* The dates of the patents here alluded to are not given, nor is it stated whether they were granted for England or Scotland

horizontal wire *d, d,* which being below the ends of yarn or thread, the whole length of the carriage D, thereby draws off the spiral coils at the point of the spindle, instead of unwinding or backing them off in the usual manner.

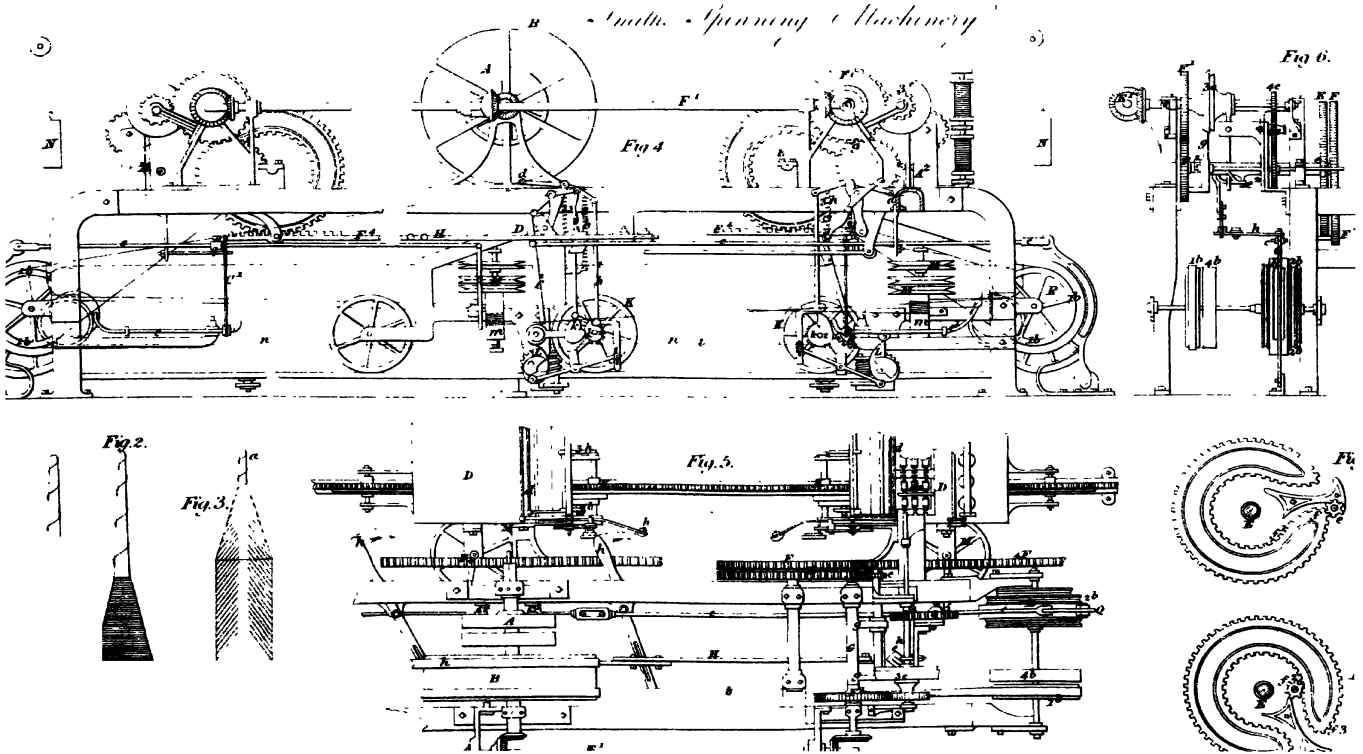
This movement I consider of great importance towards simplifying the machinery for rendering the mule self-acting; and the particular way in which I bring the stripper into action, will be more clearly seen when the properties and nature of the mangle wheel E, are farther explained.

The motion or speed at which any mangle wheel revolves, supposing the motion of the driving pinion to be uniformly the same, must depend on the circumference on which the pinion acts; but any amount of distance between the internal and external circumference on which the pinion travels will impart motion or not to the mangle wheel, according as it may form or deviate from a radius of the circle of which the mangle wheel consists. Thus in the mangle wheel used in the machine which I am describing, (represented separate at fig. 7,) in which figure the pinion is placed in the position at which it arrives when the carriage is at the end of a stretch, and the pinion having to travel down a portion of the radius from *f,* to 1 *f,* the mangle wheel E, remains at rest during this period; which period of rest allows the time required for stripping or backing off and putting down the faller, which is effected before the pinion *e,* arrives at 1 *f,* at which point it immediately commences bringing in the carriage at the increased speed due to the smaller circumference of the mangle wheel in which the pinion acts; on the other hand, when the mangle wheel has revolved to the position seen at fig. 8, and the pinion *e,* is about to travel

from the internal to the external circumference of the mangle wheel, the distance from 2 *f*, to 3 *f*, not being any part of a radius of the wheel E; the wheel E does not remain at rest, but moves at a decreasing speed, in the same proportion as the pinion recedes from its centre.

On referring to fig. 5, it will be seen that the small shaft on which the mangle wheel pinion *e*, is placed, is supported by two vibrating arms *g*, *g*, which move on the centre of the shaft G, which carries the spur wheel 1 F; so that the vibration of the arms *g*, *g*, allow the traverse of the pinion *e*, from the internal to the external circumference of the mangle wheel E, at the same time that it keeps the spur wheels 1 F, and F 2, constantly in gear.

To these vibrating arms *g*, *g*, which carry the mangle wheel pinion shaft, is attached the connecting rod H, the opposite extremity of which carries the small lever *h*, alternately in the direction indicated by a dotted line at its extremity; so that every time the carriage is at the end of a stretch, and the pinion *e*, is travelled from the exterior to the interior of the mangle wheel, the lever *h*, is carried in the direction of the bent arrow: at its extremity, this vibration of the arms *g*, *g*, which depends on the position of the mangle wheel E, also regulates the period at which the drawing rollers are put in motion, by means of an oblique slot *e* 2, seen in plan fig. 5, which vibrates a perpendicular lever, for the purpose of disconnecting the conical friction clip or coupling *e* 3, through which motion is conveyed to the front rollers, by the spur wheels *e* 4, and *e* 5. Thus at the end of a stretch the vibrations of the arms *g*, *g*, stop the drawing rollers, by disconnecting the coupling *e* 3; and when the carriage arrives in or up to the


Fig 4
Fig 6.
Fig.2.
Fig.3.
Fig.5.

front rollers, the reverse vibration of the same arms connect the coupling *e* 3, and puts the drawing rollers in motion for the succeeding stretch.

Returning again to the carriage which I have supposed at the end of a stretch, or greatest distance from the drawing rollers, it will be seen that the motion of the small lever *h*, moving in the direction of the bent arrow, will come in contact with the end of the spring 1 *h*, attached to the carriage, which, up to this period, had held the upright rod 2 *h*, as seen in the position of the opposite carriage at fig. 1. The upper end of this rod 2 *h*, is attached to a small lever on the same shaft as the small arm which carries the stripper *d*, *d*; so that as soon as the rod 2 *h*, is relieved, the stripper *d*, *d*, immediately rises up by the action of a spiral spring 3 *h*, best seen in fig. 4.

At the same time that the spiral coils of yarn upon the spindles *a*, *a*, *a*, are thus stripped and relieved from the spindle (which is no part of my invention, but merely explained to render the other movements better understood), the faller is put down by means of the same projecting lever *h*, which, in its vibration, presses against the jointed rod *i*, *i*, which is attached at its upper extremity to a small lever proceeding from the faller shaft, so that when it is forced from the bent position, as shown at *i*, *i*, in the carriage of the mule which is near the front rollers at fig. 4, to the position as shown at *i*, *i*; in the carriage of the opposite mule, it elevates the small lever at its upper extremity, and depresses the faller.

By the time the stripper and the faller are thus brought into action, the mangle wheel pinion *e*, has travelled from the position shown at *f*, fig. 7, to the in-

terior circle 1 *f*, and the carriage commences the inward traverse at the increased speed due to the smaller circumference of the mangle wheel E.

During the inward traverse of the carriage, the progressive elevation of the faller for distributing the yarn on the various circumferences of the cop, is effected by the gradual rotation of the tappet or cam-piece *k*, fig. 4, on which the small roller, at the lower extremity of the upright rod *i*, *i*, is supported. This cam or tappet *k*, is fast on a small shaft which is geared by spur wheels to the shaft of the carriage wheel K; and the speed or proportion of the gearing is such, as to cause the scroll *k*, to make one whole revolution during the going in of the carriage; and although the return or coming out of the carriage also elevates the lower extremity of the rod *i*, *i*, to its full extent, the faller is not effected or depressed, in consequence of the bent position of the joint in the rod *i*, *i*, as shown at fig. 4, in the carriage near the front rollers. The rod *i*, *i*, is forced into this bent position, by coming in contact with the projection *i* 2, immediately on its arrival at the front rollers, which allows the faller to be elevated to its original position by the spiral spring 3 *i*.

The motion gained from the carriage wheel K, for the purpose of revolving the tappet *k*, is effected by the carriage wheels going into a rack formed in the straight edge or rail on which the wheels are supported, which renders the revolution of the wheels of the carriage more certainly correct. The action of this projection *i* 2, in bending the rod *i*, also allows the spiral spring *i* 3, at the back of the faller shaft, to elevate and remove the faller clear of the spindles, preparatory to the recommencement of spinning in the succeeding stretch.

On referring to figs. 1, 2, and 3, and from what has been already said of the construction of a cop, it will be seen that the faller which, at the commencement, carried the ends of yarn to the lowest part of the spindles, must decrease in its depression at every winding on; so that, although the upward or distributing motion of the faller is the same at every going in of the carriage, the position in which this motion takes place is gradually elevated as the cop increases in size. This upward elevation of the distributing motion is effected by the gradual rotation of the larger scroll or cam L, fig. 4, on which the small arm, which carries the scroll *k*, rests.

On the same shaft, which carries the tappet L, is placed a worm wheel, which gears into a worm on a small perpendicular shaft, as seen at fig. 4; and on the lower end of this shaft is attached a ratchet wheel, one tooth of which is gathered at every going in of the carriage, so that the total number of traverses required to perform or complete a set of cops revolves the tappet L, once round, and gradually depresses the tappet *k*, which supports the rod *i*, *i*, and thereby elevates the position of the faller. The stripper, which had been forced up by the action of the coiled spring 3 *h*, is also replaced in its former position by means of the scroll or tappet 2 *k*, placed on the axis of the carriage-wheel K; but as soon as this tappet has elevated the rod 2 *h*, for the purpose of depressing the stripper *d*, *d*, the spring 1 *h*, comes under a small stop, placed on the side of the rod 2 *h*, and holds it free of the tappet 2 *k*, until it is again relieved at the end of the stretch by the lever *h*, as already described.

The winding on, or placing the yarn in successive layers on the surface of the cop at each putting up or

going in of the carriage, will be best seen by reference to fig. 4, where M, represents an upright shaft, supported at the end of the carriage, and provided with pulleys, round which the drum band 3 *b*, passes, for the purpose of driving the spindles. But so soon as the spinning ceases by the traverse of the strap *b*, on to the loose pulley 4 *b*, and the carriage commences going in, the spindles are revolved by means of the band *n*, *n*, which is attached to the small cylinder *m*, placed loose on the shaft M, and provided with a ratchet wheel, which is laid hold of by one or more spring catches, which are attached to the underside of the pulley 1 M; so that, during the spinning, or when the drum-band pulley 1 M, is in motion, it overruns the ratchet wheel or shaft *m*, which then becomes of no effect; but as soon as the spinning ceases, and the carriage commences its inward motion, the ratchet wheel laying hold of the catches, the band *n*, *n*, being held by the weight N, the drum-band pulley M 1, is caused to revolve, and the winding on is thereby effected.

This band *n*, *n*, is an endless band, passing round the carrying pulleys placed at the two extremities of the framing, but fastened to the small cylinder *m*, below the pulley M. Thus supposing the band *n*, *n*, free, it is clear that it would be carried in along with the carriage, and no rotation of the spindle would be effected; but, on the other hand, supposing it to be held stationary, a certain amount of revolutions would be effected in the spindles, dependant on the length of the inward traverse of the carriage, and the circumference of the small cylinder *m*, on shaft M, round which the band *n*, *n*, is wound and fastened to.

Now the diameter of this small cylinder *m*, is calcu-

lated and constructed to give the spindles the amount of revolutions required to wind on at the commencement of a set of cops, or when the spindles are bare, and the band is held by means of a weight N, at the extremity of another band, which passes over the pulleys, as seen in the drawing, and is attached to the band *n*, *n*, at the opposite extremity. As the cop increases in circumference, and the winding on or number of revolutions of the spindle requires to decrease, this weight is gradually elevated more and more, and it is by the aggregate tension or resistance of the ends of the yarn that the amount of this weight must be regulated. For as the total revolution of the small cylinder winds on to the bare spindle, less will be required to the increased circumference of the full cop; and the traverse of the carriage which causes the rotation being always the same, the surplus motion must be expended in winding up the weight N, which, being balanced according to the number of ends and strength of yarn to be wound on, always keeps the yarn at a proper and equal tension during the winding on at every period of the cop building.

The application of this principle of winding on may also be attained by a friction-spring, or other similar means; but I prefer the weight, as being more simple and easy of adjustment. A rack and pinion, or other contrivance, may also be used, instead of the band and cylinder.

The carriage, having arrived at the front roller, the vibration of the mangle wheel pinion again connects the drawing rollers; the strap *b*, is traversed on the fast pulley 1 *b*; the spinning recommences, and the weight N, resumes its former position.

By the foregoing description, it will be seen that by the arrangement and application of the mangle wheel,

I am enabled to take in and out the carriage at various speeds, to stop the carriage during the stripping and putting down the faller, to put the drawing rollers in and out of gear, and to traverse the lever *h*, by which both the faller and stripper are brought into action.

My next improvement in the mule and stretcher consists in the placing and arranging the traverse of the two opposite carriages of a pair of mules or stretchers, as shown at figs. 4, and 5, in which it will be remarked that I cause both carriages to travel over the centre or half distance between the two sets of drawing rollers, by which I am enabled to condense the space required for the pair of mules to stand in; and both of the mules being driven from the same shaft, and at the same speed, it is only required that one carriage should be at the front or delivering roller, when the other carriage is at or near the greatest distance or extremity of the stretch.

The space required for the machinery is not only much lessened, but the passage or distance between the two carriages, continually varying and moving along with the traverse of the carriage, keeps the piecers or hands who attend to the mule constantly up to their work, and their attention directed to the part where it is most required.

Having described my invention of certain improvements in machinery used in the preparing and spinning of cotton, flax, wool, and other fibrous substances, I hereby declare that I do not claim any of the ordinary or well-known machinery used in the mule or stretching frame, nor do I claim any of the machinery or apparatus by which the invention of the stripper, which I use in the place of backing off, is made applicable to my improved arrangements for effecting other movements of the machine. But I do claim as my invention,

firstly, the application and adaptation of the mangle wheel or mangle rack to the mule or stretcher, for effecting certain successive movements, either separately or in conjunction, in those machines, as have been hereinbefore described.

Secondly, I claim that arrangement of the carriages of a pair of mules or stretching frames, by which the traverse or stretch is caused to take place over part of the same ground by both carriages, and thereby the space required for the working of the pair of mules or stretching frames is greatly diminished, along with the other advantages hereinbefore described. And,

Thirdly, I claim as my invention, the application of a weight, spring, or friction, for balancing the tension of the ends or threads; in winding on which, from the description hereinbefore given, it will be seen, may in like manner be effected by any equivalent power applied in the same way, to act as a movable and yielding counterpoise to the pull of the threads. By which application the quantity of motion, and the force or power given or provided to turn the spindles in winding on, becomes modified in its transmission to the spindles in any requisite degree. The excess of given motion over and above what is requisite to wind on the yarn or thread being expended in lifting or moving the yielding counterpoise, while the extreme power or force capable of being transmitted or conducted through the apparatus, and on which power or force the degree or tension of the winding on depends, is necessarily limited by the actual weight or power of resistance of such counterpoise; which counterpoise, it has been already shown, admits of adjustment in any required degree.—[*Inrolled in the Inrolment Office, August*, 1834.]

Specification drawn by Mr. Nicholson.

*To* GEORGE FREEMAN, *of Tewkesbury, in the county of Gloucester, lace manufacturer, for his having invented certain improvements in machinery for ornamenting and producing devices upon lace.*—[Sealed 22d February, 1832.]

THIS invention consists in adapting certain wheels or cams upon a rotary shaft to a lace machine, of the kind known in the lace-making trade by the name of the *traverse warp machine*: the intention of which rotary cams is to produce certain operations upon the levers, and other working parts of the machine, for the purpose of separating portions of the warp threads in making a particular fabric called bobbin-net quilling.

The evolutions of the machine thus produced by the rotary cams, cause certain portions of the warp occasionally to become embroidering or spotting threads, and afterwards to return again to their ordinary work, producing the meshes of plain net. By these means the old practice of cutting away the connecting portions of the spotting threads, between the respective spots or parts of the embroidered figures, is obviated, and, consequently, the lace produced is of a more perfect and finished quality.

One advantage attendant upon this improvement in the traverse warp machine is, that a lesser number of threads are necessary to perform the work than according to the old mode.

The Patentee says, "Supposing the width of the intended lace to consist of one hundred warp threads, and it is desired to leave a spot to every fifth thread, there would then, on the old plan, be twenty additional threads on separate spools or bobbins, making, in the

whole, one hundred and twenty threads. These spotting threads would be passed through guides in the spotting bar, but they would only be brought into operation at the times when it is desired to make the spots; at other times they would not be worked into the lace, the plain net being formed by the ordinary threads only: consequently, the additional threads, extending from spot to spot, would require to be cut off before the lace was finished, or would hang loosely to the disfigurement of the pattern. By my improvements in making a similar width of lace, the additional spotting threads are dispensed with, and a like number of threads are taken from the warp, which, as before observed, act both as spotting threads and warp threads alternately."

The Patentee further states, that as the traverse warp machine is well understood, and only requires a very slight alteration, by the addition of certain wheels, for giving certain additional motions to the ordinary spotting bar, it will not be necessary to describe the machine itself; he therefore limits his description to the additional parts, and to the motions which they are to produce.

He proceeds to say, "In order that my invention may be fully understood, I will describe the means which I pursue in order to obtain the object of my invention. I will suppose myself placed in front of an ordinary traverse warp machine, which is fitted up with spotting bars, as if it were intended to make spotted lace according to the old method. I apply to this machine certain wheels, which are represented in the drawing."

The drawing here referred to is not a representation of the traverse warp machine with the improved parts adapted, but merely the scale and outline figures of the indentations on the edges of the several cams, techni-

cally called the "*cut of wheels.*" This, with the description of where they are to be placed, and how far apart, may probably be sufficient for the purposes of a workman in adapting them to a traverse warp machine; but they could not be reduced into the compass of one of our plates with any degree of usefulness, nor would it be possible to render their objects understood by the reader, unless he was well acquainted with the construction, movements, and effects of a traverse warp machine, and had one actually standing before him while reading the description. We shall, therefore, content ourselves with giving a few extracts from the specification, which is a very long one, and from which, we conceive, the intentions of the Patentee will be as well understood as if the whole document were to be transcribed literally.

"On to the dividing bar is affixed (mounted, but rotary, we presume,) the axle or spindle of the spotting wheels; and these move together with the dividing bar. The axle of the spotting wheels is affixed near the right hand end of the dividing bar. On this axle is placed five wheels: the wheels are kept about three-quarters of an inch apart by washers, and they are held together by screws passed through them. The first wheel, called the bottom driving or ratchet wheel, has ten teeth. The second is the spotting wheel, and acts upon the front spotting bar. This spotting wheel has seven rises and seven falls; each rise and each fall, with the exception of one fall at the finishing of the spot, is equal to one twenty-fourth part of an inch in height and depth, which is equal to one space in the dividers. The third wheel is also a spotting wheel, and acts against the back spotting bar: this wheel has eight rises and eight falls. The fourth wheel is a driving

ratchet wheel with two teeth, one opposite the other. The fifth, or top wheel, is also a driving or ratchet wheel, with twelve teeth in it.

"Those threads which are intended to act as spotting threads, in place of being wound on the warp beam, are placed on separate bobbins or beams. I use four separate bobbins, two large and two small ones. On the two larger bobbins are put the threads which are in the middle of the breadth for forming the spot, while the two outer threads next the selvages of each breadth are put on the smaller bobbins. By this arrangement I am enabled, by means of the dividing points, to prevent such outer spotting threads passing into the next breadth when they have spotted; but such threads work into the selvages at the time the other spotting threads are making spots.

"In order to produce the lifting of the weights which act on those of the warp threads which are passed through the guides in the ordinary spotting bars, and which act as spotting threads as well as warps, about one foot above the right hand end of the machine, I place an axle having two wheels, the one a driving ratchet with ten teeth, the other an excentric or cam having one rise and fall. This, as it revolves, comes in contact with one end of a lever which lifts the weight.

"The lever is suspended under the weight which it has to raise, one end of the lever being broad or spoon-like to receive the weight; the other end is acted upon and depressed by the cam wheel.

"The driver which acts upon the ratchet wheel drives that wheel one tooth every time that a cross or finishing of the hole is effected. The bobbins which contain the other spotting threads are similarly acted upon."

Two other wheels, a ratchet having ten teeth, and a

cam having two rises and falls, are placed in a similar way at the left hand end of the machine, for the purpose of operating upon the lever, which raises the weight that presses upon the bobbins containing the other spotting threads.

The remainder of the specification describes the movements of the various parts of the traverse warp machine, which, for the reasons before given, we do not think it necessary to recite.—[*Inrolled in the Inrolment Office, August*, 1832.]

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*To* JOHN BROWN, *of Heaton Norris, in the county of Lancaster, cotton manufacturer, and* THOMAS HEYS, *of the same place, book-keeper, for their invention of an improvement in the machinery used for spinning cotton, silk, flax, and other fibrous substances, commonly called throstles.*—[Sealed 8th September, 1832.]

THIS invention is stated to be an improved method of causing the bobbins of a throstle to move up and down, for distributing the yarns or threads from the flyers uniformly upon the bobbins from end to end. The improvement or novelty is by no means obvious to us, but such as it is we give it to our readers, in the shape in which it is represented by the Patentees in the drawing accompanying their specification.

Plate XI, fig. 1, represents a portion of the front of a throstle frame, exhibiting several spindles with their bobbins and flyers as they would appear in operation. Fig. 2, is a transverse section of the same: *a*, is the side standard of the machine; *b*, the bottom rail, on which the lower ends of the spindles *c*, *c*, *c*, bear, turning in steps; *d*, is the copping rail extending along the

front of the machine, and on which the bobbins *e*, *e*, *e*, respectively bear; *f*, is another rail parallel to the copping rail, and connected thereto by a series of pillars *g*, *g*, placed at suitable distances apart. Through sockets in these rails the spindles pass, and are by that means kept in their perpendicular positions.

The rails *d*, and *f*, thus braced together as a frame, slide up and down in guides *h*, affixed to the end standard, and in sockets *i*, in the fixed rail *b*, at bottom The spindles pass through the bobbins, and to their upper ends are attached the flyers, as usual.

The spindles are respectively driven by bands, which bands are passed round the pulleys, whirls, or warves, from a rotary drum *k*; and in this way the flyers are made to revolve, and to twist or spin the yarns delivered from the drawing rollers above.

If the copping rail *d*, on which the bobbins bear, was stationary, the yarns from the arms of the flyers would be wound round the bobbins only about the middle of their barrels; but as that rail and the bobbins are made to rise and fall, the yarns are necessarily wound in uniform helical coils upon the barrels of the bobbins from end to end.

This movement of the copping rail is effected by a reciprocating roller *l*, from which chains descend to arms or brackets *m*, attached to the lower part of the pillars *g*, or in any other way connected with the copping rail. The shaft *l*, by the ordinary mechanism, we presume, as a mangle wheel and pinion, is made to reciprocate upon its axis, in order to give the rail *d*, and *f*, and the bobbins *e*, such ascending and descending movements as are required for winding on the yarns from the ends of the flyers in regular coils.

Such is the improved construction of throstles pro-

posed by the Patentees, on which we can throw no further light, except by stating the assumed advantages which are enumerated under five heads.

First, that as the friction upon the spindles is not confined to one part, but is distributed over the extent to which the rails *d*, and *f*, move up and down, consequently the spindles will last longer than in ordinary throstles. Second, that as the bobbins are lifted by the rail, they will be supported thereby. Third, the speed of the spindles may, when necessary, be accelerated (in consequence, we presume, of their vibrations being in some measure prevented by the two guide rails *d*, and *f*,). Fourth, the spindles may be made very light, and thereby prevent friction, and reduce the power necessary for driving them. Fifth, a saving in the expenditure of oil will accrue by greasing the spindles with an oiled sponge.—[*Inrolled in the Inrolment Office, November*, 1832.]

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*To* JOHN M'DOWALL, *of Johnston, near Paisley, in the county of Renfrew, Scotland, mechanist and engineer, for his improvements in metallic pistons, pump-buckets, and boilers of steam-engines.*—[Sealed 12th May, 1834.]

THE Patentee states, that his experience in the working of cast-iron pistons in steam-engines has led him to observe, that the surfaces of the metal between the segments and the plates against which they slide rapidly corrode, and become converted into a substance resembling plumbago, by which the effectiveness of the piston is, of course, seriously impaired. As a remedy for this defect in cast-iron pistons, he lines or covers

the said surfaces with plates of brass or gun-metal, which are firmly united to the iron by pinning in the manner known to workmen.

Another peculiar feature in the Patentee's improvements in metallic pistons, consists in the construction and adaptation of a sliding steam-stop between the segments; the object being apparently to render a piston consisting of a single tier of segments equally steam-tight with those which have a double tier, there being plugs or pieces to break joints, or cover the interstices between the segments. Plate XI., fig. 7, represents the piston, the rod being fixed into a solid central block of cast-iron, the bottom and top of which is covered with a plate of greater diameter, thereby forming around the central block an annular groove or recess for the reception of the segments *a*, *a*, for packing. These segments are continually pressed outwards by the action of internal springs in any of the ordinary modes.

To prevent an irregular abrasion by the action of the piston against the internal surface of the cylinder of the engine, the openings between the segments are made to incline—that is, they are cut obliquely, instead of perpendicularly: from which arrangement it will be seen, that as the motion of the piston is in the line of its axis, the inclined lines cover each other, and prevent the surface of the cylinder being unequally worn.

To prevent the steam from passing through these inclined spaces, gun-metal slides are fitted into dovetailed grooves made in the adjoining segments, which are faced to stop the steam laterally; and to prevent it passing upwards or downwards a rhomboidal notch is cut out of each corner of the adjoining segments, into which a rhomboidal piece *b*, *b*, is accurately fitted.

Thus are ingeniously obtained the advantages of a double tier of segments, without their complexity and expense; and thus is avoided the tendency which the latter have of wearing the cylinder into ridges. This tendency will become obvious, on reflecting that in the ordinary double rings of segments of packing at every joint there is only half the thickness of metal rubbing against the cylinder, compared to the other parts: consequently, only half the wearing or abrasion of the cylinder occurs at those parts, and the other parts of the cylinder become worn into grooves.

The second part of the invention relates to improvements in the pump-buckets of steam-engines. The construction of the packing at the lower parts of these buckets, is the same as in the pistons just described. The buckets have apertures or passages for the water and air through the central part, as usual; but, owing to the rapidity with which these valves work in the air-pumps of steam-engines, they are apt, by the resistance of the water in the down strokes of the bucket, to strike violently against the guards or checks which limit the range of their action.

To avoid the destructive effects of these collisions, the Patentee has devised what he terms his "water guard." This is a hollow or concave cap, shown in the vertical section, fig. 8, at *a a*. It is made of the same area as the circular plate of the valve *b*, and shuts up and down upon the central part of the bucket. Now, as this cap or water-guard *a*, is always filled with water, a liquid resistance is constantly presented to the blow of the metallic plate *b*, preventing that concussion by instantaneous contact, and that vibration, noise, and friction to which the ordinary air-pump valves are subject.

Brown & Heps Spinning Throstle

Fig 1.

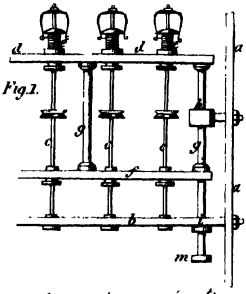
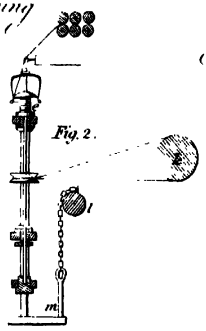



Fig 2.




Mr Donalls Pistons &c Boilers

Fig 7

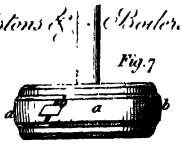
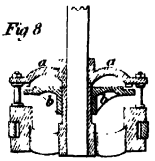



Fig 8




Broughtons Apps &c for Preparing Cement

Fig 3

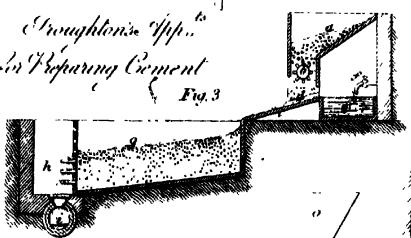



Fig 9

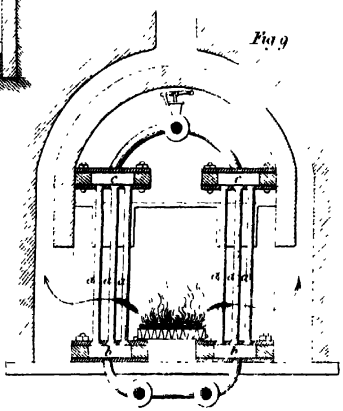



Fig 4

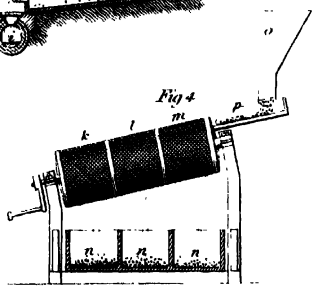



Fig 5.

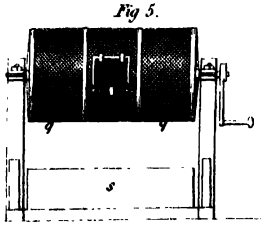



Fig 6

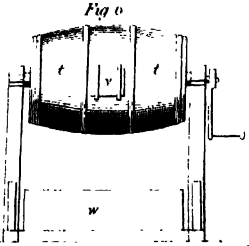



Fig 11

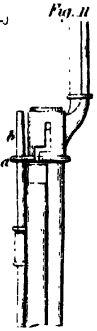
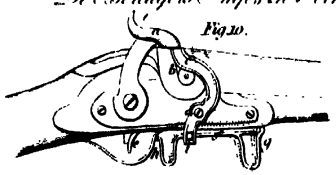



Fig 12




De Berenger's Imp.t in Arms

Fig 10.



*To* NICHOLAS TROUGHTON, *of Swansea, in the county of Glamorgan, copper smelter, for his invention of an improvement or improvements in preparing the materials for and in producing a cement, applicable to building and other purposes, which he denominates metallic cement.* —[Sealed 8th September, 1832.]

THIS invention consists, in the first place, in a particular method of washing the stamped or powdered slag from ore of which the cement is to be partly composed, in order to separate from such slag of ore the mineral which discolours the cement when exposed to the action of the atmosphere. Secondly, in a new method, and the machinery for sifting the said powder ore, so as to separate it into different sorts or degrees of fineness. Thirdly, in a new mode of combining it with the lime and other materials, if any, when in a dry state, in order to reduce the powdered material to a state fit for working up with water for use. And, fourthly, in the mode of working the same up with water for the use of cement, by means of machines and apparatus adapted to perform such process.

The Patentee says—Previously to entering upon the description of the drawings, the various figures of which represent the mode of carrying into effect the improvements alluded to under the first, second, third, and fourth heads of my invention, it is necessary to premise that various slags, the refuse of smelting furnaces, have been heretofore suggested as useful for the purpose of being reduced to powder, in order to be converted into cement. Of these the slags from copper smelting furnaces have been found the best adapted for the purpose, and, beyond the memory of man, have been used in a powdered state for mixing with lime, to form a cement for building and other purposes.

It has, however, been found, that the particles of copper which remain in the slag after the operation of smelting, tend greatly to discolour the cement made from such materials when exposed to the action of the atmosphere. It is for the purpose of extracting or separating these deleterious particles of copper from the powdered slag, that the process of washing is proposed, which forms the first head of this invention.

Plate XI., fig. 3, is a section of the apparatus which I use for washing the powdered slag, and which, in all cases, I reduce to powder, in the first instance, by one of the ordinary modes of stamping or grinding: *a*, is a hopper, into which is introduced a quantity of the said powdered slag; *b*, is a small cylinder furnished with spikes or teeth over its external surface, and kept constantly revolving in the lower part or bottom of the hopper, in order to cause the powdered slag to fall gradually from the hopper; *c*, is a board placed on an inclined plane under the hopper, and furnished with short longitudinal divisions, one of which is shown at *d*, to make separate channels for the water to run down.

A tank or reservoir of water *e*, is fed from any convenient source by the cock *f*: this tank should be a little higher at the sides and back than the highest part of the inclined plane *c*, so that the water introduced by the cock *f*, may flow over the front edge of the tank, and run down the channels of the inclined plane *c*. By this operation, the light powdered slag will be carried down the inclined plane, while the pieces of copper contained in it will, by their weight, be left at the head of the trough *g*, which trough is for the purpose of receiving the powdered slag so washed down the board or inclined plane.

This trough is furnished with plugs at different heights at one end, to let off the water above the pow-

dered slag as it collects in the trough: *h*, is a space or open chamber, to enable the workmen to get at the plugs; and *i*, is a gutter or drain to carry off the waste water so let off.

Fig. 4, represents a large open wire-work cylinder, with meshes of the size of about ten to the square inch at *k*, twenty to the square inch at *l*, and twenty-four to the square inch at *m*, mounted on an axle placed at an angle of elevation from the floor over a box *n*, containing three compartments, one under each variety of mesh; *o*, is a hopper with a shoot or spout *p*, from which the cylinder is fed with washed powdered slag. This cylinder being turned by hand or otherwise, the slag is sifted through into the box below, each compartment receiving powder of a different degree of fineness.

The powder which falls into the third compartment, under *k*, is for the first coat, whether of inside or outside work, and should be mixed with two parts of slacked lime to four parts of slag. The powdered slag which is collected under the second sieve *l*, is for the second and last coat of outside work, and should be mixed with an equal quantity of slacked lime; and that which is collected under the first sieve *m*, is for the last coat for inside work, and should also be mixed with an equal quantity of slacked lime.

Fig. 5, represents the mixing machine, in which the slacked lime and powdered and sifted slag are mixed together; *q*, is a large wire open-work cylinder, with a door and opening at *r*, furnished with a receiving box *s*, underneath, and mounted upon an axle. The powdered and sifted slag and lime, in proper proportions for the work required, are to be put into this cylinder, which is then to be turned by hand or otherwise, and the powder which falls through into the receiving box will be properly mixed cement powder, in a dry state.

Fig. 6, represents a front elevation of a machine for working up the cement powder when properly mixed with water for use. It consists of a barrel *t*, mounted like a churn, with a door and opening at *v*. In the interior of this barrel, at certain distances apart, are placed long teeth or pins for stirring up or mixing the cement.

The powder having been mixed in a proper way, is put into the barrel, and a suitable quantity of water added thereto that is sufficient to bring it to the required consistence for use; the door *v*, must then be fastened, and the barrel turned by hand or otherwise, till the whole is thoroughly worked together, when the cement will be found fit for immediate use. On the door *v*, being opened, the contents of the barrel may be emptied into the trough *w*, placed below to receive it.

The Patentee concludes by saying—"Now, whereas I claim as my invention the following improvements—that is to say, first, washing the powdered slag intended for cement, and abstracting the pieces of copper therefrom, to prevent subsequent discolouration in the cement, as also the apparatus by which the said washing is performed. Secondly, the application of a revolving cylindrical sieve, on the principle of those used for sifting wheaten flour, for the purpose of sifting powdered slag and lime intended for cement. Thirdly, the mixing machine, shown at fig. 5, applied to the purpose hereinbefore described, of mixing the lime and slag powder to form the cement powder. And, fourthly, working up the cement powder with water for use, by means of the machine shown at fig. 6."—[*Inrolled in the Inrolment Office, November*, 1832.]

*To* CHARLES RANDOM, BARON DE BERENGER, *of Target Cottage, Kentish Town, in the parish of St. Pancras, in the county of Middlesex, for his having invented improvements in fire-arms, and in certain other weapons of defence.*—[Sealed 27th February, 1830.]

THE subjects of this patent may be described under three general heads: first, certain mechanical contrivances to prevent the accidental discharge of fire-arms; second, to secure the priming from damp or rain; and, third, to prevent a bayonet being readily displaced from the end of a musket.

There are several modes proposed of preventing the accidental discharge of fire-arms, consisting of sliding bolts and levers of different kinds, which are to be operated upon by the hand when the piece is brought to the present, previous to firing.

Plate XI, fig. 10, shows the lock and breech part of a fowling-piece, with a sliding protector on one of the improved plans, attached thereto: *a*, is the cock or hammer; *b*, the conical piece or nipple, communicating with the touch-hole; *c*, a bent lever, turning upon a pin, fixed into the lock plate at *d*.

The upper end of this bent lever stands partly under the nose of the cock or hammer, and while in that situation stops the cock or hammer from falling and striking upon the nipple; thereby acting as a bolt or lock to prevent the discharge of the gun, if the trigger should, by accident, be struck.

A slider *f*, *g*, *h*, connected to the under part of the gun-stock, is attached to the tail of the bent lever at *i*; and when the piece is brought to the shoulder for firing,

the hand of the sportsman pressing against the bent part of the slider at *g*, forces the slider back, and by that means moves the end of the lever *c*, forward from under the nose of the cock, as shown by the dotted lines. The trigger being then drawn, the piece will be discharged; and on removing the hand from the end *g*, of the slider *f*, the spring at *h*, acting against the guard, will force the slider forward, and the lever into the position first described.

The same sort of contrivance of a spring slider may be adapted to an apparatus within the lock, which shall act upon the sear, or upon some other part of the mechanism, and prevent the cock from being discharged,—until released by the hand of the sportsman pressing back the sliding spring bolt.

In the second head of the invention it is proposed to ignite the charge within the gun by means of a percussion cap, pellet, or other priming, applied to a nipple at the back part of the breech. In doing this it is proposed to adopt a sort of false breech, which shall open by a spring or lever, in order to gain access to the interior for the purpose of priming. This false breech or piece, which closes the recess wherein the priming is deposited, may, by various contrivances, be made to close the aperture, so as to prevent damp or rain from insinuating itself to the priming chamber.

The third head of the invention, which is a mode of preventing a bayonet being dismounted from the nozle of a musket, or other fire-arms, consists in attaching a piece to the side of the bayonet handle, with a small hole in it, through which the end of the ramrod is to pass. Fig. 11, shows a part of the end of a musket, with the bayonet so fastened: *a*, is the piece extending

from the handle of the bayonet, having a hole in it, through which the end of the ramrod *b*, made small for that purpose, is passed. When the bayonet is so confined or bolted by the end of the ramrod, it is considered that it could not be dismounted from the nozle of the gun by a skilful swordsman, which is often the case with bayonets mounted in the ordinary way.

Another invention is added towards the close of the specification, which is not enumerated in either of the heads first set forth. This is a mode of giving additional weight to a sabre, in order to increase the effect of such light regulation swords as may be suited to the strength of small men, when wielded by more powerful men. This is done by attaching an additional blade to the ordinary blade of the sword by means of a clip piece, as shown in the representation of a part of a sword at fig. 12: *a*, is the ordinary sword; *b*, the additional blade connected thereto by a clip piece *c*, and fastened by screws. This additional blade will give weight to the sword, and render it more effective in the hands of a powerful man.—[*Inrolled in the Inrolment Office, August*, 1830.]

## LITERARY NOTICE.

### GORDON ON LOCOMOTION.

A new edition of this work has lately emanated from the press with very considerable additions, both literary and graphic. The author has, in this treatise, brought together a mass of interesting matter, indeed we may

say valuable information, as to the progress of improvements in locomotion; a subject which is every day becoming of greater importance, both individually and nationally.

Instead of sketching out the general features of this work, it will be sufficient for us to say, that the various plans of improvement which have been devised, connected with propelling both on water and land, have been carefully reported; and the author has added many practical remarks, arising from his own experience, which will be highly useful. From the whole, by way of conclusion, the author has drawn a summary of the vast advantages that have resulted from the extensive cultivation of those branches of mechanical science which are connected with steam as a motive power, and has also hinted at the wide spreading range of adaptation to which this power may probably, ere long, be made subservient.

Though many, indeed most of the matters here treated of, have been the subjects of patents, and of course will be found scattered through the pages of our Journal, yet we feel much pleasure in recommending this treatise to the notice of our readers, as a very useful digest of inventions, many of which, without such a consecutive arrangement, might be passed by unnoticed and forgotten.

# List of Patents

*Granted in Scotland from 14th June, 1834.*

(Continued from p. 185.)

To Henry Pinkus, lately of Pennsylvania, in the United States of North America, but now of Wigmore-street, Cavendish-square, gentleman, for an invention of an improved method of, or apparatus for, communicating and transmitting or extending motive power, by means whereof carriages or waggons may be propelled on railways or common roads, and vessels may be propelled on canals.—14th June.

— William Morgan, of the Kent-road, in the county of Surrey, Esq., for an invention of improvements in certain kinds of steam-engines.—23d June.

— Philip Augustus de Chapeaurouge, of Fenchurch-street, in the city of London, gentleman, in consequence of a communication made to him by a certain foreigner residing abroad, for an invention for producing motive power, which he denominates a self-acting motive power, and called in France by the inventor "volant moteur perpetuel."—23d June.

— Henry Hardington Leggett, of Fulham, in the county of Middlesex, gentleman, for an invention of certain improvements in the art of printing in colours.—27th June.

— Matthew Bush, of Dalmonarch Printfield, near Bonhill, by Dumbarton, North Britain, calico-printer, for an invention of certain improvements in machinery or apparatus for dyeing and printing calicoes and other fabrics.—27th June.

— Thomas Alcock, of the parish of Claines, in the county of Worcester, lace-manufacturer, for an invention of certain improvements in machinery for making lace or net, commonly called bobbin-net lace, part of which improvements will enable such machinery to produce ornamental bobbin-net lace.—27th June.

To Thomas Sharp, merchant, and Richard Roberts, engineer, both of Manchester, in the county palatine of Lancaster, in consequence of a communication from a foreigner resident abroad, for an invention of certain improvements in machinery for grinding corn and other materials.—11th July.

— Charles Wilson, of Kelso, in the county of Roxburgh, in that part of the United Kingdom of Great Britain and Ireland called Scotland, for an invention of certain improvements applicable to the machinery used in the preparation for spinning wool and other fibrous substances.—17th July.

— William Septimus Losh, of Walker, in the county of Northumberland, gentleman, for an improved method of bleaching certain animal fats, and certain animal, vegetable, and fish oils. —17th July.

— Joseph Shee, of Laurence Pountney-place, in the city of London, gentleman, for an invention of certain improvements in distillation.—17th July.

— James Hamilton, of Threadneedle-street, in the city of London, civil-engineer, for an invention of certain improvements in machinery for sawing, boring, and manufacturing wood, applicable to various purposes.—17th July.

— John Aston, of Birmingham, in the county of Warwick, button-maker, for an invention of an improvement in the manufacture or construction of buttons.—21st July.

— John Gold, of Birmingham, in the county of Warwick, glass-cutter, for an invention of certain improvements in cutting, grinding, smoothing, polishing, or otherwise preparing glass-decanters, and certain other articles.—21st July.

— Peter Wright, of the city of Edinburgh, manufacturer, for an invention of an improved method of spinning, twisting, and twining cotton, flax, silk, wool, or any other suitable substance.—22d July.

— Isaac Jacks, junior, of Bennet's-hill, in the city of London, gentleman, for an invention of an apparatus or machine for putting or drawing on or off boots.—25th July.

To Luke Hebert, of the Hampstead-road, in the county of Middlesex, civil-engineer, for an invention of certain improvements in machines or apparatus for and in the process of manufacturing bread and biscuits from grain.—30th July.

— Richard Simpson, late of Rouen, in the kingdom of France, but now residing in Southampton-row, Bloomsbury, in the county of Middlesex, gentleman, for an invention communicated to him by a foreigner then resident in France, of certain improvements in machinery for slubbing and roving wool and cotton.—1st August.

— William Higgins, of Salford, in the county of Lancaster, machine maker, in consequence of communications made to him by a foreigner residing abroad, for certain improvements in machinery used for making twisted rovings and yarn of cotton, flax, silk, wool, and other fibrous substances.—5th August.

— Henry Ewbank, of Idol-lane, in the city of London, merchant, in consequence of a communication made to him by a certain foreigner residing abroad, for an invention for dressing rough rice or paddy, and certain other grain, by rubbing off its skin or pellicle, and redressing or cleansing rice.—5th August.

— Daniel Ledsam and William Jones, both of Birmingham, in the county of Warwick, screw-manufacturers, for an invention of certain improvements in machinery for making pins, needles, rivets, wood-screws, and nails.—6th August.

— John Rapson, of Penryn, in the county of Cornwall, engineer for an invention of an improved apparatus for facilitating the steering of vessels of certain descriptions.—18th August.

— William Hale, of Colchester, in the county of Essex, engineer, for an invention of certain improvements in or on windmills, which improvements are applicable to other purposes.—26th August.

— Joseph Whitworth, of Manchester, in the county palatine of Lancaster, machinist, for an invention of certain improvements in machinery or apparatus for cutting screws.—29th August.

To John George Bodmer, of Bolton-le-Moors, in the county palatine of Lancaster, civil-engineer, for an invention of certain improvements in the construction of grates, stoves, and furnaces, applicable to steam-engines and many useful purposes.—12th September.

— John George Bodmer, of Bolton-le-Moors, in the county palatine of Lancaster, civil-engineer, for an invention of certain improvements in steam-engines and boilers applicable both to fixed and locomotive engines.—12th September.

— James Berrie and David Anderson, both of the city of Glasgow, in Scotland, manufacturers, for an invention of a machine or machines for making a new or improved description of heddles or healds to be used in weaving.—19th September.

## List of Patents

*Granted by the French Government from the 1st of January to the 31st of March*, 1834.

To Benjamin Rotch, of London, represented in Paris by Mr. Perpigna, of the French and Foreign Office for Patents, No. 4, Rue de Choiseul, for a rotatory steam-engine.

— Pierre Gerente, represented in Paris by Mr. Perpigna, for an improved machine for cutting the dents or teeth of files and rasps.

— Isidore Moisson, represented in Paris by Mr. Perpigna, for a new method of dyeing with madder.

— Henri Edwards, of Paris, for improvements in steam-engines.

— Fleury Dufourt, of Irigny, for improvements in the tools used by joiners and carpenters.

— Riviere and Braithwaite, of London, for an improved steam-engine.

To Jacques Forestier, of Paris, for a machine for cleansing corn.

— Eugene Francois Vidocq, of Paris, for improvements on the patent taken out by Messrs. Debraine and Kersselaers, for a kind of paper called sensitive.

— Auguste Lebobe, of Paris, for metallic coverings for houses.

— Pierre Jullien, of Paris, for an improved method of manufacturing china and earthenware.

— Pierre Demurger, engineer, of Paris, for a machine for cleaning corn.

— Pierre Machard, of Paris, for a method of extracting from rosin a kind of oil applicable to all the purposes of lamp oils.

PATENTS FOR TEN YEARS.

To Antoine Fidele Marie Bremond, of Brignolles, represented in Paris by Mr. Perpigna, for improvements in tanning.

— Borrani Junior, stove-manufacturer, for improved stoves.

— Savinien Jeubert, of Paris, for improvements in lamps.

— Etienne Rey, of Lyons, for an improved method of teaching drawing.

— Clement Brierre, of Paris, for a machine for carding and cleaning the refuse of silk.

— Jean Francois Havard, for an improved protracter for measuring angles.

— Henri Santel, of Lyons, for improved stoves and fire-grates.

— Gilbert Brewster, of America, for an improved spinning machine.

— Jacques Louis Travers, of Paris, for an improved kind of window.

— Pouillett Brothers, of Paris, for a new apparatus for warming dwelling-houses.

— Charles Antoine Lehmann, of Berlin, for a method of preparing straw, so as to render it a substitute for horse-hair, wool, &c.

— Hubert Felix Palluy, of Paris, for an improved kind of bellows.

To Cronier and Coté, of Rouen, for a new method of singeing cotton or linen fabrics.

— Jean Lagarde, of Darmazan, for an hydraulic machine.

— De la Croix Saint Clair, of Orleans, for a machine for cutting pin-nails.

— Melly and Motard, of Paris, for the saponification of fat by quick lime.

— Francois Manceaux, of Paris, for a method of manufacturing helmets with tanned leather.

— Alexandre Francois Silligue, of Paris, for an improved crane.

— Joseph Dubourg, of Paris, for an improved method of manufacturing coffee by steam on a large scale.

— Jean Baptiste Etiennot, of Paris, for a new method of sawing fire-wood.

— Doublet and Rouen, of Paris, for an improved coffee-pot.

— Nicolas Verrier, of Paris, for an improved waggon, to be used on rail-roads.

PATENTS FOR FIVE YEARS.

To Claude Laurent, flute-manufacturer, represented in Paris by Mr. Perpigna, for an improved flute.

— Alexis de Barde, of Marlborough, represented in Paris by Mr. Perpigna, for a new method of preserving cattle from strangulation.

— Jean Baptiste Alphonse Daubré, of Paris, for a machine called by him *Délisseuse Mécanique.*

— Victor Auguste Garriques, of Poissy, for an apparatus for buoying up any ships damaged by storm.

— Pierre Francois Chatelain, for a machine for making eyelet holes and open work in muslins.

— Bocquet Bouillard and Co., of Paris, for an improved kind of pasteboard.

— Jacques Francois Baudoin, of Paris, for a method of manufacturing sulphate of quinine without alcohol.

— Chretien Joseph Farbender, of Paris, for a mechanical fender.

— Jean Seyffert, of Paris, for a method of covering with zinc the roofs of houses.

To Mothes and Dublanc, of Paris, for an instrument for making gelatinous capsules.

— Louis Antoine Lebel, of Compiegne, for an improved method of numbering houses, and indicating the names of streets.

— Jean Cabanis, of Ville Vieille, for a new kind of mill for grinding wheat.

— Louis Alexandre Martin, of Paris, for a new method of bleaching and cleansing calicoes.

— Jean Charles Bouré, of Levergies, for an improved method of imitating embroidered flowers in ornamented fabrics.

— Pierre Lacaze, of Nimes, for a plough for cultivating vines.

— Dumonthier Brothers, of Houdan, for an improved knife, which may be used as a safety-bolt.

— Charles Thomas, of Rouen, for an improved manner of navigating rivers.

— Francois Alphonse Chardin, of Paris, for a process of manufacturing a new kind of chenille.

— Jean Baptiste Desiré Raimbaut, of Paris, for applying to the printing of silk the process used in printing ornamental papers used for the hanging of rooms.

— Sudds, Adkins, and Barker, of Rouen, for an improved horizontal water-wheel.

— Lioret and Son, of Paris, for an improved kind of waggon used for conveying coal or charcoal.

— Huard and Fouju, of Paris, for a method of making paper with leaves of trees, couch-grass, and the ligneous part of asparagus.

— Anne Jean Moutier, of Paris, for certain improvements in the art of building.

— Isaac Pigcaire, of Montpelier, for a new kind of press.

— Cuny and Jourdain, for a clog, provided with a warming apparatus.

— Bourdeil Desarnod, of Paris, for a new kind of smoke-consuming apparatus.

— Delsarte, of Solesmes, for a new kind of spring-gun.

— Ferdinand Southanet, of Paris, for an improved kind of shoe.

To Léonor Thomas de Manneville, of Paris, for a safety-coach with two wheels.

— Jullien Jacques Dumont, of Paris, for an apparatus for accelerating the passage of the syrup through the charcoal.

— Auguste Delhomme, of Paris, for a new kind of motive power.

— Joseph Chenu Gille, of Chalons-sur-Saone, for a machine for improving the make of the sheet-iron pipes, used as flues for stores.

— Denis Peyre, ribbon-manufacturer, of St. Etienne, for an improved frame for making plush and velvet.

— Thomassin Brothers, of Beauvoir, for a method of preserving chimneys from smoke.

— André Brocard, of Montmedy, for an improved portable chain-pump.

— Francois Nisolle, jun., of Santerre, for an indelible black dye.

— Leroux Grossel and Lainé, of Paris, for a new kind of parchment.

— Edouard Cellier, of Rouen, for a method of extracting the indigo contained in the shearings of cloth.

— André Louis Achille Decant, of Paris, for an improved pump.

— Henri Lemoine, of Paris, for a waggon for delivering firewood ready measured.

— Gaspard Gregoire, of Paris, for hydrostatic balloons for measuring the depths of the sea.

— Belot and Piolenc, of Paris, for a new kind of pastry.

— Adolphe Baudon Parchez, of Paris, for a new kind of calefyer.

— Edme Enfer-Béon, of Troyes, for an improved kind of bellows.

— Jean Francois Courhant, of Paris, for a new apparatus for depriving excremental matters of their smell, and reduce them into manure.

— Gabriel Despruneaux, of Paris, for an improved syringe.

— Louis Joseph Lainé, of Paris, for a new method of sifting fecula.

ADDITIONAL SPECIFICATIONS INROLLED FOR IMPROVEMENTS BY THE PATENTEES THEMSELVES.

To Wheatly and Riste, of Leicester, represented in Paris by Mr. Perpigna, on their frame for making bands of bobbin-net with edging or quilling.

— Wheatly and Riste, of Leicester, represented by Mr. Perpigna, on their bobbin-net frame.

— Brame Chevalier, of Lille, represented by Mr. Perpigna, on his sugar-refining apparatus.

— Mathieu and Sarrazini, represented by Mr. Perpigna, on their gas-making apparatus.

— Jean Isidore Pinet, on his loom.

— Cordier Lalande and Deffieux, of Paris, on their lamp.

— Jaillet, of Lyons, silk-manufacturer, on his frame for manufacturing ornamented tissues.

— Antoine Galy Cazalat, on his steam-carriage.

— Jacques Labourey, on his machine for propelling ships by manual labour.

— Pierre Hugues, of Bordeaux, on his sewing-machine.

— George Dauré, of Paris, on his distilling apparatus.

— Charles Abel David, on his method of substituting paper to the pasteboards used in the Jacquart frame.

— Pierre Isidore Rouen, of Paris, on his hydraulic regulator for measuring the action of liquids.

— Burat Brothers, of Paris, on their trusses.

— Jean Zuber and Co., on their paper-making machine.

— Hamond and Benaud de Viback, on their steam-carriage.

— Louvrier, of Paris, on his system of manufacturing and refining sugar.

— Jean Baptiste Alphonse Leroux Dufié, on his apparatus for receiving the droppings of syrup in sugar refineries.

— Louis Cresson d'Orval, on his apparatus for manufacturing surgical instruments of caoutchouc.

— Louis Réné Frère, of Paris, on his pectoral lozenges.

To Pierre Hyacinthe Accolas, on his method of closing sluices of canals.

— Auguste Guillaume Taupier, on his method of teaching to write.

— Robert Winter, of Paris, represented by Mr. Perpigna, on his washing-machine.

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## New Patents
## SEALED IN ENGLAND,
## 1834.

To John Hearle, of Devonport, in the county of Devon, engineer, for his invention of certain improvements on engine pumps, applicable to ships and every other purpose that a pump can be applied.—Sealed 3d November—6 months for inrolment.

To Joseph Gibbs, of Kennington, in the county of Surrey, engineer, for his invention of certain improvements in carriages, and in wheels for carriages.—Sealed 3d November—6 months for inrolment.

To Samuel Bagshaw, of the parish of St. James, in the county of Middlesex, for his invention of an improved filter for water and other liquids.—Sealed 6th November—6 months for inrolment.

To Peter Rothwell Jackson, of Bolton-le-Moors, in the county of Lancaster, engineer, for his invention of certain improvements in hydraulic presses and pumps. —Sealed 6th November—6 months for inrolment.

To James Walton, of Sowerby-bridge, in the county

of York, cloth dresser and finisher, for his invention of certain improvements in the machinery used for raising the pile of woollen and other cloths.—Sealed 12th November—6 months for inrolment.

To Daniel Rutter Long, of Bath, in the county of Somerset, chemist, for his invention of a new mode of applying certain anteputrescent and flavouring substances to meat.—Sealed 13th November—6 months for inrolment.

To Jean Michel Cramer, of Leicester-square, in the county of Middlesex, mechanic, for his invention of an improved steam-engine.—Sealed 13th November—6 months for inrolment.

To Charles de Bergue, of Clapham, in the county of Surrey, engineer, for his invention of certain improvements in machinery for spinning or twisting cotton, flax, silk, and other fibrous substances.—Sealed 15th November—6 months for inrolment.

To Lemuel Wellman Wright, of Sloane-terrace, Chelsea, in the county of Middlesex, engineer, for certain improvements in machinery or apparatus for making paper, being partly a communication from a foreigner residing abroad.—Sealed 15th November—6 months for inrolment.

To Edward Galley Giles, of Lincoln's-inn-Fields, in the county of Middlesex, gentleman, for certain improvements on apparatus for engraving on copper and certain other substances, being a communication from a foreigner residing abroad.—Sealed 15th November—6 months for inrolment

To Samuel Garner, of Lombard-street, in the city of London, gentleman, for an improvement in the art of multiplying certain drawings and engravings or impressions, being a communication from a foreigner residing aboad.—Sealed 15th November—6 months for inrolment.

To William Crofts, of New Radford, in the county of Nottingham, machine-maker, for his invention of certain improvements in certain machinery for making figured or ornamented bobbin-net, or what is commonly called bobbin-net-lace.—Sealed 20th November—6 months for inrolment.

To William Wells, of Salford, in the county of Lancaster, machine-maker, and George Scholefield, of the same place, mechanical draftsman, for their invention of an improved apparatus or machine for cutting the pile or cords of fustians and other fabrics manufactured of cotton, wool, and other fibrous materials.—Sealed 20th November—6 months for inrolment.

To Robert Whiteside, of Air, in the county of Air, wine-merchant, for his invention of certain improvements in the wheels of steam-carriages, and in the machinery for propelling the same, also applicable to other purposes.—Sealed 20th November—6 months for inrolment.

To Alexander Craig, of Edinburgh, for improvements in steam-engines, being a communication from a foreigner residing abroad.—Sealed 25th November—6 months for inrolment.

To James Lutton, of Tudor-place, Tottenham-court-road, in the county of Middlesex, chair-maker, for his

invention of certain improvements on castors for furniture.—Sealed 25th November—6 months for inrolment.

To Robert Joseph Barlow, of Rudley, in the North Riding of Yorkshire, for his invention of certain improvements in springs applicable to carriages, and other purposes.—Sealed 25th November—6 months for inrolment.

To James Couch, of Stoke, Devonport, captain in the Royal Navy, for his invention of certain improvements in ships' channels.—Sealed 25th November—6 months for inrolment.

To Jacob Tilton Slade, of Carburton-street, Fitzroy-square, in the county of Middlesex, gentleman, for his invention of an improved metallic sheathing for the bottoms of ships or vessels.—Sealed 25th November—6 months for inrolment.

To John Donkin, of Blue Anchor-road, Bermondsey, in the county of Surrey, civil engineer, for certain improvements in the machinery for making paper, being a communication from a foreigner residing abroad.—Sealed 25th November—6 months for inrolment.

## CELESTIAL PHENOMENA, FOR DECEMBER, 1834.

D. H

1 Clock after the ☉ 10 m. 48 s.
-- ☽ passes the mer. 0 h. 32 m.
13 30 ♃'s first sat. will em.
2 6 46 ♀ in conj. with the ☽ diff. of dec. 0 25. S.
13 19 ☿ stationary.
3 7 59 ♃'s first sat. will em.
Clock after the ☉ 9 m. 12 s.
- ☽ passes the mer. 4 h. 24 m.
14 46 ♅ in conj. with the ☽ diff. of dec. 4. 17. N.
7 12 42 ☽ in □ or first quarter.
15 25 ♃'s first sat. will em.
10 Clock after the ☉ 7 m. 1 s.
-- ☽ passes the mer. 8 h. 0 m.
9 54 ♃'s first sat. will em.
15 ☽ in Apogee
11 1 18 ☿ greatest elong. 21. 10. W.
12 8 51 ♀ ascending node.
14 Mer. R. A. 15 h. 58 m. dec. 18. 31. S.
- Ven. R. A. 18 h. 15 m. dec. 23. 0. S.
- Mars R. A. 7 h. 22 m. dec. 25. 20. N.
- Vesta R. A. 3 h. 25 m. dec. 11. 23. N.
- Juno R. A. 20 h. 42 m. dec. 13. 36. S.
- Pallas R. A. 15 h. 29 m. dec. 1. 54. N.
- Ceres R. A. 15 h. 23 m. dec. 13. 13. S.
- Jup. R. A. 4 h. 11 m. dec. 20. 16. N.
- Sat. R. A. 13 h. 21 m. dec. 6. 3. S.
- Georg. R. A. 21 h. 43 m. dec. 14. 25. S.
- ☿ passes the mer. 22 h. 28 m.
- ♀ passes the mer. 0 h. 44 m.
- ♂ passes the mer. 13 h. 49 m.
- ♃ passes the mer. 10 h. 38 m.
23 ♃ in conj. with the ☽ diff. of dec. 0. 22. N.
15 Partial eclipse of the moon, visible at Greenwich.
First contact with Penumbra, 14 h. 0 m. 3 s.
First contact with dark shadow, 15 h. 18 m. 8 s.
Middle of the Eclipse 16 h. 47 m. 8 s.
Last contact with dark shadow, 18 h. 16 m. 8 s.
Last contact with Penumbra, 19 h. 35 m. 3 s.
Digits eclipsed 8·1 on the Southern limb.
15 Clock after the ☉ 4 m. 40 s.
☽ passes the mer. 11 h. 44 m.
16 55 Ecliptic oppo. or ○ full moon.
17 20 ♃'s first sat. will em.
17 13 44 ♂ in conj. with the ☽ diff. of dec. 0. 42. N.
19 6 17 ♃'s first sat. will em.
20 Clock after the ☉ 2 m. 13 s.
— ☽ passes the mer. 16 h. 13 m.
21 3 48 ♀ in inf. conj. with the ☉
18 30 ☉ enters Capr. Winter comm.
23 0 49 ☽ in □ or last quarter.
24 Mer. R. A. 16 h. 53 m. dec. 21. 54. S.
— Ven. R. A. 17 h. 50 m. dec. 20. 28. S.
— Mars R. A. 7 h. 7 m. dec. 26. 10 N.
— Vesta R. A. 3 h. 19 m. dec. 11. 39. N.
- Juno R. A. 20 h. 59 m. dec. 13. 1. S.
— Pallas R. A. 15 h. 45 m. dec. 2. 6. N.
— Ceres R. A. 15 h. 39 m. dec. 14. 20. S.
-- Jup. R. A. 4 h. 6. m. dec. 20 5. N.
— Sat. R. A. 13 h. 24 m. dec. 6. 17. S.
— Georg. R. A. 21 h. 45 m. dec. 14. 17. S.
— ☿ passes the mer. 22 h. 45 m.
— ♀ passes the mer. 23 h. 33 m.
— ♂ passes the mer. 12 h. 55 m.
— ♃ passes the mer. 9 h. 54 m.
24 10 20 ♄ in conj. with the ☽ diff. of dec. 2. 8. S.
13 44 ♃'s first sat. will em.
25 Clock before the ☉ 0 m. 16 s.
— ☽ passes the mer. 20 h. 22 m.
26 8 12 ♃'s first sat. will em.
18 ☽ in Perigee.
28 14 31 ☿ in conj. with the ☽ diff. of dec. 0. 25. N.
21 10 ♀ in conj. with the ☽ diff. of dec. 4. 23. N.
29 3 1 ☿ in the descending node.
19 12 Ecliptic conj. or ● new moon.
30 Clock before the ☉ 2 m. 44 s.
— ☽ passes the mer. 0 h. 15 m.
17 39 ☿ in conj. with ♀ diff. of dec. 4. 32. S.
31 15 39 ♃'s first sat. will em.

J. LEWTHWAITE, Rotherhithe.

# METEOROLOGICAL JOURNAL,

## FOR OCTOBER AND NOVEMBER, 1834.

| 1834. | Thermo | | Barometer. | | Rain in inches. | 1834. | Thermo. | | Barometer. | | Rain in inches. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hig. | Low. | High. | Low. | | | Hig. | Low | High. | Low. | |
| Oct. | | | | | | Nov. | | | | | |
| 26 | 50 | 38 | 30,24 | 30,19 | | 11 | 52 | 37 | 30,09 | 29,99 | ,175 |
| 27 | 53 | 35 | 30,34 | 30,30 | | 12 | 47 | 36 | 30,20 | 30,19 | ,025 |
| 28 | 57 | 39 | 30,46 | 30,40 | | 13 | 46 | 34 | 30,25 | 30,19 | |
| 29 | 51 | 46 | 30,54 | 30,53 | | 14 | 48 | 30 | 30,33 | 30,30 | |
| 30 | 53 | 47 | 30,46 | 30,31 | | 15 | 48 | 35 | 30,30 | 30,23 | |
| 31 | 58 | 42 | 30,15 | 30,08 | | 16 | 46 | 31 | 30,17 | 30,14 | |
| Nov. | | | | | | 17 | 51 | 37 | 30,07 | 30,03 | |
| 1 | 58 | 49 | 30,05 | Staty. | | 18 | 51 | 36 | 30,05 | 30,02 | |
| 2 | 59 | 50 | 30,04 | Staty. | | 19 | 44 | 30 | 30,13 | 30,09 | |
| 3 | 58 | 46 | 30,02 | 29,97 | | 20 | 43 | 28 | 29,94 | 29,80 | |
| 4 | 60 | 45 | 29,89 | 29,80 | | 21 | 47 | 30 | 29,78 | 29,70 | |
| 5 | 63 | 50 | 29,72 | 29,55 | | 22 | 45 | 36 | 29,92 | 29,86 | |
| 6 | 61 | 56 | 29,63 | 29,58 | ,125 | 23 | 47 | 30 | 30,01 | 29,98 | |
| 7 | 60 | 53 | 29,53 | 29,44 | ,4 | 24 | 46 | 32 | 29,99 | 29,93 | |
| 8 | 54 | 46 | 29,43 | Staty. | ,2 | 25 | 44 | 35 | 29,88 | 29,84 | |
| 9 | 51 | 40 | 29,55 | 29,45 | ,25 | | | | | | |
| 10 | 47 | 39 | 29,89 | 29,83 | ,2 | | | | | | |

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

THE

# JOURNAL OF ARTS AND SCIENCES,

AND

# REPERTORY

OF

# PATENT INVENTIONS.

*CONJOINED SERIES.*

No. XXXIII.

## Recent Patents.

*To* JOHN BETHELL, *of Mecklenburgh-square, in the parish of St. Pancras, county of Middlesex, gentleman, for certain improvements in machinery or apparatus for making metal screws, pins, bolts, and rivets.*— [Sealed 24th April, 1834.]

THESE improvements in machinery or apparatus for making metal screws, pins, bolts, and rivets, are applicable to that description of machines or apparatus in which screw-blanks, pins, bolts, or rivets, are made from metal rods or wire, the ends of which are compressed into recesses in dies to form the heads, the thread of the screws being afterwards cut upon the blanks by separate machines. They consist, in the first place, in an improved arrangement or construction

of machinery or apparatus for cutting off the required lengths of wire or metal-rods, and afterwards compressing their ends to form the heads; secondly, in an improved construction of die, for forming the head of the screw-blank, bolt, pin, or rivet, to be used in machines or apparatus employed for heading of screw-blanks, pins, bolts, and rivets; and, thirdly, in an improved manner or method of feeding or conducting the screw-blanks into screwing machines, where the thread or worm is cut upon them: and afterwards removing the finished screw from the machine; such screwing machines being constructed as described in the specification of a patent granted to Lemuel Wellman Wright, dated the 18th day of September, one thousand eight hundred and twenty-eight, the specification of which was duly inrolled in the office of the Rolls Chapel of the High Court of Chancery; in which patent right the present Patentee states he is beneficially interested, and to which specification he refers for the better explanation of some parts of the present invention.—See a report of this specification in vol. v., Second Series, of the London Journal of Arts, p. 314.

The first part of this invention, *videlicet*, the improved arrangement or construction of the machine or apparatus, for cutting off the required lengths of metal, wire, or rod, and compressing their ends to form the heads of the screw-blanks, bolts, pins, or rivets, is exhibited in the several figures in Plate XII.

Fig. 1, is a side elevation of the machine; and fig. 2, a plan or horizontal view of the same; similar letters of reference being used to denote similar parts in both figures: *a, a*, is the framework and standards of the machine; *b*, is the driving shaft, wh . receives its motion by a band passed over a rigger from a steam-

engine or other first mover: on this shaft is a pinion, taking into a spur wheel on the main shaft *c*, of the machine.

The end of the length of metal rod or wire *d*, is conducted into the machine through the feeding apparatus or tongs *e*, *e*, mounted upon a sliding plate; which tongs are made to close upon the wire, and bring it forward under the operation of the cutter *f*, which severs the required portion from the length of rod.

The movement of the feeding apparatus is effected by the following means:—On the main shaft *c*, is mounted the cam *g*, against which cam the anti-friction roller, on the end of the sliding bar *h*, works. This bar is mounted in bearings projecting from the standards of the machine, and is connected at its reverse end to the vertical lever *i*, mounted on a pin or stud projecting from the framework as its fulcrum. The upper end of this lever takes into a slot in the piece *j*, which is connected by toggle-joint pieces to the ends of the legs of the feeding tongs *e*.

As the longer radius of the cam *g*, comes into operation upon the roller on the bar *h*, it will cause that bar to slide, and the lever *i*, to close the feeding tongs upon the wire or metal rod, and carry forward the required length of material through the opening in the cutter to form the shaft of a screw, pin, bolt, or rivet. When this is effected, the cutter is made to descend by the cam *k*, on the main shaft, as it revolves, raising the longer arm of the lever *l*, (turning on a pin or stud fixed in the framework,) and depressing the opposite end, which draws down the bar of the cutter *f*, and thereby cuts off the length or required portion of the rod or wire. After this is done, a pair of spring clips or fingers *m*, carry

the piece to the situation opposite to the mouth of the heading die at *n*.

The inner side of the rim or groove of the cam *o*, now acts upon the roller, shown by dots, attached near the end of the sliding bar *h*, and draws it, with the lever *i*, back into their former positions; by which movement the lever *i*, will cause the tongs to open and recede, in order to bring forward another portion of the rod or wire, as before described.

The sliding lateral movements of the carrying fingers *m*, are produced by the curved groove between the double cams *p*, *p*, at the end of the main shaft; which cams act upon a roller projecting from the lower end of the vertical lever *q*, having its fulcrum on a pin or stud in a bracket projecting from the frame. The other end of this lever is connected to the sliding bar *r*, of the carrying fingers, which is mounted in bearings in the top part of the frame. By these means the carrying fingers are moved to and fro across the machine, to receive the portions of the wire or rod, and carry them opposite the mouth of the heading die *n*; at which time the heading punch advances and forces the end of the portion of rod or wire into the die, when the fingers will retreat out of the way of the punch, and take hold of another portion of the wire or rod which has been previously cut off.

The next movement of the feeding tongs, in bringing in another length of wire, forces the severed portion out of the cutter-blade into the fingers, when it is free to be carried away to the die. The movement of the heading punch, which compresses the end of the piece of rod or wire into the die to form the head, is effected by the large cam *s*, mounted upon the main

shaft, which acts against the anti-friction roller mounted in the lower arm of the heading lever *t*, its fulcrum being a pin or bolt passing through the upper part of the framework. The shorter arm of this lever acts against the end of the sliding bar *u*, of the heading punch *v*, and, carrying the punch forward, forces the piece of wire into the die, and compresses the end of it into the cup or recess in the die, which forms the head.

When this is effected, the larger radius of the cam *s*, will cease to act on the lever *t*; and the cam, heading punch, bar, and lever, will then be brought back into their former position, and the now-headed screw-blank, pin, bolt, or rivet, will be forced out of the die by the following means:—On the main shaft *c*, is mounted the toothed wheel *w*, taking into a similar wheel mounted on the auxiliary shaft *x*. This shaft carries another cam *y*, which, as it revolves, acts against the end of the lever *t*, and forces it back. The links or bridle-pieces which connect the shorter arm of the lever *t*, to the sliding bar *u*, will draw back that bar, and with it the heading punch. To the sliding bar *u*, are attached the rods or bars *z*, *z*, which are connected together at the reverse ends by the cross head 1, carrying the sliding piece 2; the other end of which is formed into a T-shaped head 3, working between guides in the framework: against this head the adjusting screws of the punch 4, rests, which punch, by means of another smaller one, hereinafter more particularly described, forces the headed screw-blank, pin, bolt, or rivet, out of the die, as the heading punch and bar recedes from it; but when the operation of heading is performed, the part 3, 3, stands back against the projecting pieces 5, 5, of the framework, and forms an abutment for the punch while the wire is being compressed to form the head.

I would only remark further, it will of course be evident that it is requisite to place adjusting screws at all parts of the machine where there is an adjustment required, to suit different lengths of screw-blank, bolts, pins, or rivets; but which it is not necessary for me to describe, as all persons conversant with this description of machinery will be fully aware of their proper situations.

The second part of these improvements applies to the construction of the dies, to be used in machines or apparatus for heading screw-blanks, pins, bolts, and rivets; and in which the end of the piece of metal rod or wire is to be compressed, in order to form the head of the bolt, pin, screw-blank, or rivet, and consists in forming the die solid, or in one piece, instead of two parts, as in machines of the usual construction. The die is a solid block, of twice the usual length of the intended screw-blank, pin, bolt, or rivet, with a cup or recess in each end; by which means the same piece or block of metal is made to answer the purpose of two distinct dies, by reversing its position in the machine. This part of the improvement applies also to the construction of the punch, which forces the screw-blank, bolt, or rivet, out of the die after the head has been formed upon it by the machine.

Fig. 3, is an external representation of one of these improved dies, removed from the machine with the forcing punch withdrawn from it.

Fig. 4, is a section taken through the same, with the forcing punch placed in the die and in its position when the shaft is being headed.

Fig. 5, is another section, taken when the punch is forced into the die, to expel the headed screw-blank, pin, bolt, or rivet. These figures are drawn on a larger scale: *a*, is the die; *b*, the punch, fitting accurately

within it; *c*, is the cup or recess, where the head of the screw-blank, pin, bolt, or rivet, is to be formed. It will be understood that the end of the forcing punch which is in the die forms an abutment for the end of the piece of wire or rod while it is heading; and that the head, or enlarged end of the punch *b*, rests against the end of the bar 4, mentioned in reference to fig. 2, under the first of these improvements.

The Patentee here remarks, that when dies are constructed in this manner, and the forcing punch is at all times kept within them, that the reverse end of the piece of wire or rod cannot become bulged or enlarged, so as to cause it to fix itself to the back part of the die; as is the case when the aperture through the die is only of the same length as the shaft of the screw-blank, pin, bolt, or rivet, introduced into it.

The third part of this invention, the improved manner or method of feeding or conducting the screw-blanks into screwing machines, when the thread or worm is to be cut upon them, and afterwards removing the screw therefrom, is exhibited at figs. 6, and 7, which are outline representations of a screwing machine, constructed under the specification of L. W. Wright, before mentioned, with these improved parts adapted thereto, which are shaded to distinguish them: those parts of the machines which are superseded by these improvements, not being shown in the drawings. Fig. 6, is a plan or horizontal view of the machine; and fig. 7, a section taken longitudinally through the same; the parts standing in the situations they would occupy while the screw-thread or worm is being cut upon the blank. On reference to the specification of Mr. Wright, before mentioned, it will be seen that the screw-blanks were conducted from a feed-wheel through

a long tube, placed in the spindle *a*, into the holding chaps *b*, which have a reciprocating rotatory motion given to them. The screw-blanks were held by these chaps while the worm or thread was cut upon them by the screwing dies *c*; and after the thread had been formed, the screws were removed by a pair of spring fingers. In this improved method, the boy attending the machines introduces the blanks between a pair of fingers placed opposite the screwing dies, which carry them through those dies into the holding chaps, the chaps being open to receive them; the holding chaps immediately take hold of the blanks in the way described by Mr. Wright, and the screwing dies then close upon the blank, and cut the thread thereon. After this the screwing dies open again, and allow another pair of spring fingers to take hold of the now-threaded screw, and remove it from the holding chaps, when another blank may be introduced as before: *d*, is the feeder or pair of fingers in which the screw-blanks are placed; these fingers are mounted on the end of the bar *e*, and are in the same position, and worked in the same manner, as those described by Mr. Wright in his specification for fetching away the finished screw: the present Patentee only uses them for the reverse purpose: *f*, is the pair of fingers for taking away the finished screw from the holding chaps, which are placed upon the end of a bent bar *g*, sliding in bearings in the piece *h*, attached to the framework of the machine. This sliding bar has a pin *i*, projecting from its under side, which takes into a slot in the lever *k*, turning on a pin *l*, as its fulcrum; the other end of this lever is connected by another slot and pin to the sliding bar *m*, which bar is worked by a cam *n*, on the main shaft, as described by Mr. Wright in his specification. The

Bells Imp.d Machinery for making Screws

Fig 7

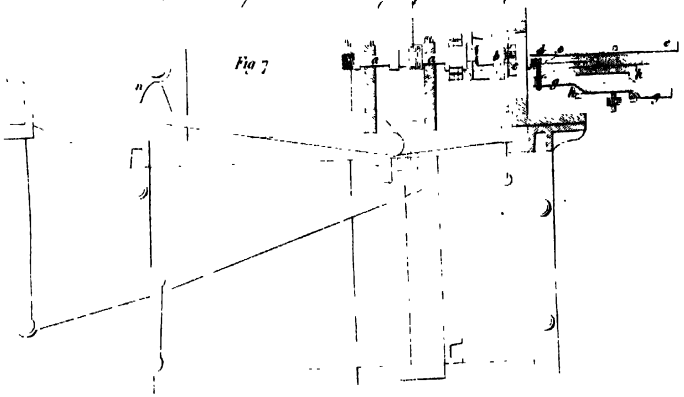


Fig 6.

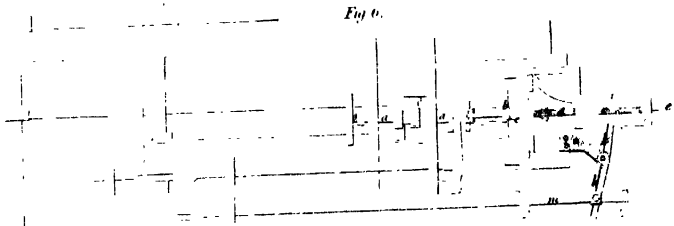


Fig 1

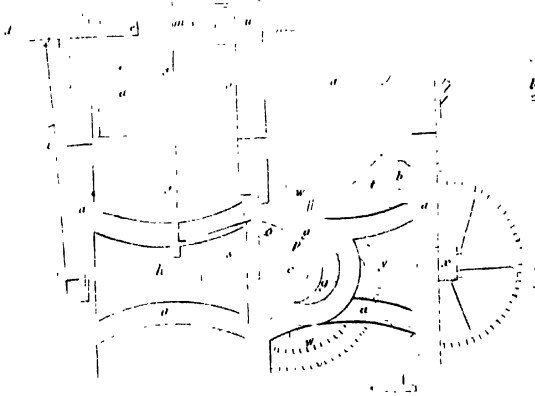


Fig 8.

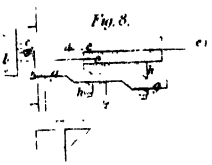


Fig 9.

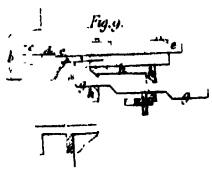


Fig 2

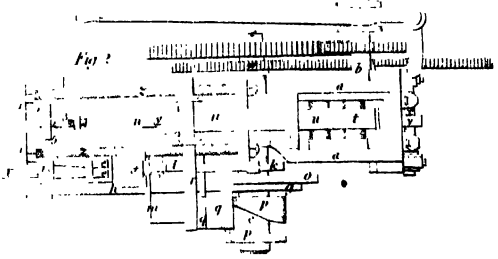


Fig 3.

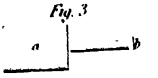


Fig 4.

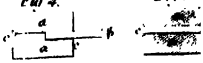


Fig 5



W Mennell

operation of these parts is as follows:—As soon as the thread or worm is cut upon the blank by the screwing dies, they open as described by Mr. Wright, when the sliding bar *m*, is moved by its cam in the direction of the arrow, which will draw back the feeding fingers *d*, and by means of the lever *k*, force forward the discharging fingers *f*; at the same time they rise by the inclined planes on the bar *g*, coming against those on the bearings, and take hold of the screw in the holding chaps, as shown in the partial section in fig. 8, when they open and release the screw. At this time the attendant places another blank in the feeding fingers *d*, and the bar *m*, begins to move back; by which means the fingers *f*, take away the finished screw, and the feeding fingers *d*, introduce another blank in the holding chaps, as shown in the other partial figure 9. The chaps and dies then close upon the blank; at which time the discharge fingers *f*, are moved backward, until the stationary driver *o*, forces the screw out of them, when it falls away into a receptacle placed below. After this both pair of fingers are moved by the cam and bar into the position shown in figs. 6, and 7, ready to undergo the next operation, as before described.—[*Inrolled in the Rolls Chapel Office, October,* 1834.]

Specification drawn by Messrs. Newton and Berry.

The immense force required to be brought into operation for compressing the solid metal into the form of the head of a screw on Mr. Wright's plan, caused the minor details of his machinery to be frequently strained, and consequently deranged in their action: the simple form of mechanism adopted by the present Patentee is principally designed for the prevention of this difficulty.

*To* RICHARD SIMPSON, *of Southampton-row, Bloomsbury, in the county of Middlesex, gentleman, for an invention communicated to him by a foreigner residing in France, of improvements in machinery for roving and slubbing cotton and wool.*—[Sealed 3d June, 1834.]

THESE improvements in machinery for roving and slubbing cotton and wool, consist in certain novel contrivances to be adapted to machinery for roving and slubbing cotton and wool, particularly to that construction of machinery described in the specification of a patent granted 26th February, 1831, to David Selden, of Liverpool, in the county of Lancaster, merchant, for an invention of a "certain improvement or certain improvements in machinery used to give a degree of consistency to, and to wind on to bobbins, barrels, or spools, rovings of cotton, and the like fibrous substances," being a communication from a foreigner residing abroad. The specification of which invention was inrolled in the office of the Rolls Chapel, and a report of it is given in vol. viii., Second Series, of the London Journal of Arts and Sciences, p. 74.

The inventions which form the subject of the present patent, were also communicated to the present Patentee by a foreigner resident abroad; and consist, firstly, in an improved arrangement of apparatus, by which the slubbings or rovings, as they descend from the drawing rollers to be wound upon the spools, bobbins, or barrels, are compressed by a temporary twisting, which is effected by passing the slubbings or rovings between the two opposing surfaces of a travelling endless band. Secondly, in a novel piece of mechanism, by means of which the bobbins, spools, or barrels, are traversed to and fro endways, in order to enable the rovings or slub-

bings, as they wind thereon, to be laid in uniform helical coils from end to end, or nearly so, of the bobbins, barrels, or spools (as is usually done by what is called a copping motion), with a self-regulating apparatus, by means of which the extent of the traverse is gradually shortened, for the purpose of laying the rovings or slubbings toward the ends of the cylindrical bobbins, barrels, or spools, in the form of a frustrum of a cone: and, thirdly, in a peculiar modification of the rubbing surfaces, described in the before-mentioned patent of David Selden, for the purpose of giving compactness and tenacity to the rovings or slubbings of cotton or wool.

In Plate XIII., fig. 1, is a front elevation of the complete machine, in which the first and second features of the improvement are embodied. Fig. 2, is an end view of the same. A, is the rigger by which the machine is driven by a band from any first mover, as a steam-engine, water-wheel, or other power. The rigger A, is fixed upon the shaft of the lower range or front row of drawing rollers; and at the reverse end of this shaft a pinion B, is attached, which takes into other toothed gear, for the purpose of giving the required rotary motion to the drawing rollers in the ordinary way. The cotton or wool, in the state in which it has been delivered from the preparing machinery, is conducted over the cylindrical guide roller C, C, C, and through the system of drawing rollers D, D, D, in the usual manner, where, having been elongated, it passes down to the bobbins E, E, E, and is wound thereon by the means hereafter described.

There is a bevel-toothed wheel F, affixed to the end of the axle of the rigger A, which takes into a corre-

sponding mitre wheel G, at the upper part of the vertical shaft H; the lower part of this shaft also carries a similar bevel-toothed wheel I, gearing with a corresponding mitre wheel K, fixed upon the end of the horizontal shaft L, on which shaft there is a fluted roller or long pinion M: a toothed wheel N, taking into this long pinion M, is attached to the axle of a drum or barrel O, mounted in the sliding frame or carriage P, P, P; and at the reverse end of this frame, or carriage, a similar drum or barrel is also mounted, which together conduct a travelling endless band Q, Q, tightly distended over them, for the purpose of effecting the winding of the rovings or slubbings on to the barrels, bobbins, or spools; and the carriage is made to slide to and fro, to accomplish what is commonly called copping.

In the upper rails of the sliding frame or carriage, both at the back and front, corresponding series of forks or staples R, R, R, are inserted, in which the ends of the axles of the several bobbins E, E, E, are confined, for the purpose of preserving their positions; the periphery of each bobbin bearing upon the surface of the travelling endless band Q, Q.

It will now be perceived that by the rotation of the rigger A, the train of pinions and shafts F, G, H, I, K, and L, are actuated; and that by the fluted roller or long pinion M, fixed upon the shaft or axle L, the toothed wheel N, and the drum or barrel O, are made to revolve, and to conduct the endless band Q, Q, along the machine: which band, as it travels, causes the several bobbins to revolve upon their axes by the friction of the surface of the band against the bobbin in passing; and consequently, as the rovings or slubbings continue descending from the drawing rollers D, D, D,

they are, by the rotation of the bobbins, barrels, or spools E, E, E, wound respectively round their peripheries.

In order to bring the fibres of the rovings or slubbings of the cotton or wool into such a degree of contact, as will afford sufficient tenacity or strength to enable them to be wound tightly upon the barrels, bobbins, or spools, the rovings or slubbings, as they descend from the rollers, pass between two rubbing surfaces, produced by a travelling endless band S, S; by the friction of which a temporary twist is given to the rovings or slubbings, but that twist is discharged from the rovings or slubbings, in the act of winding on to the spools, barrels, or bobbins.

The endless band S, S, is distended over two pulleys T, T, and its double part is drawn tight against the face of a guide rail U, U, by two other adjustable pulleys pressing behind: all of which pulleys turn upon studs affixed to the board V, V, and the guide rail U, is also made fast thereto. This board V, is mounted upon two perpendicular sliding rods W, W, passed through staples or eyes attached to the end frames or standards of the machine. The board and its appendages is supported by the lower ends of the perpendicular sliding rods W, W, bearing upon the levers X, X, affixed to the horizontal longitudinal shaft Y, Y; and the whole is nearly counterpoised by the lever and pendent weight Z.

The travelling of the rubbing band S, is effected by means of a fluted roller or long pinion *a*, upon the vertical shaft H, which takes into the teeth of a horizontal wheel *b*, fixed upon the axle *c*, of one of the pulleys T. Hence it will be perceived, that as the vertical shaft H, is driven by means of the train before described, that the wheel *b*, axle *c*, and pulley T, will revolve also; and

that the doubled band S, will be consequently made to travel along the front of the guide rail U; and the fibres of the rovings or slubbings in their descent, as they pass between the rubbing surfaces of the band, will be twisted above the points of contact, thereby giving tenacity or consistency to the rovings or slubbings; but that twist will become dissipated by a counter twist below the points of contact, and the rovings will be laid upon the bobbins with straight fibres. The same train will simultaneously give such movement to the other endless band Q, as will cause the bobbins, spools, or barrels to revolve, and wind the rovings or slubbings thereon.

In order to keep the two surfaces of the rubbing band S, close together, the doubled parts of the band are made to slide in a series of small guide loops *d*, *d*, *d*, affixed to the face of the board U, U, seen also in the detached sectional fig. 3, and in the partial front view fig. 4, where the band S, is removed, in order to show the mode of attaching the guide loop and the straight spring piece *e*, which is intended to press behind the strap, for the purpose of keeping the two surfaces together.

It has been before said, that the sliding board V, and its appendages, are nearly counterpoised by the lever and weight Z; it is, therefore, now to be observed, in reference to this part of the machine, that a slight preponderance in the weight of the sliding board V, and its appendages, over that of the weighted lever, is necessary, for the purpose of keeping the twisting strap or band S, sufficiently near to the bobbins, to conduct the rovings thereon with regularity.

I now proceed to describe the construction of the piece of mechanism constituting the second head of

the invention, which is for the purpose of traversing the bobbins, barrels, or spools endways, instead of what is commonly called the copping motion, causing the rovings or slubbings to be wound thereon in uniform helical coils, and also for forming them with conical ends: this piece of mechanism is but imperfectly seen in the front and end views of the machine, figs. 1 and 2; it is, therefore, represented as it would appear in different positions in the several attached figures, 5, 6, 7, and 8. Fig. 5, shows this apparatus in elevation, as seen in a back view of the machine, part being attached to the hinder rail of the standard of the machine, and part to the sliding frame or carriage P. This carriage, in which the drums or barrels O, of the endless band Q, are mounted, moves to and fro from back to front of the machine, and *vice versa*, on wheels *f*, *f*, running upon the transverse rails *g*, *g*; and the reciprocating movements of the carriage are effected by the mechanism about to be described. Fig. 6, represents the mechanism as it would appear when viewed at right angles to fig. 5; the sliding carriage P, and back rail of the machine, being shown in section. A plan or horizontal view of the same is exhibited at fig. 7.

The hinder extremity of the axle of one of the bobbins E, viz. E*, fig. 1, has an endless screw or worm *h*, shown at figs. 5, and 6: which worm takes into a long pinion *i*, fixed on the upper part of the vertical shaft *j*; and the bobbin E*, is kept down in contact with the band Q, by means of hooks and weighted levers J, J, connected to the ends of its axles. The vertical shaft *j*, turns in a loop attached to the top rail of the carriage P, and is supported at bottom in a bracket extending from the under rail of the carriage, see fig. 6. At the lower part of the shaft *j*, there is a pinion *k*, see fig. 5,

the teeth of which take into the threads of one of the screwed or grooved shafts *l*, or *m*, mounted in a frame *n*, *n*, *n*; and as the bobbin E,* is made to revolve upon its axis by means of the travelling band Q, as before described, the worm *h*, causes rotary motion to be communicated to the pinions and vertical shaft *i*, *j*, and *k*: the latter of which, as it revolves, meeting with resistance in the thread of the screw-shaft *l*, as shown at figs. 3, 5, and 7, impels the sliding frame or carriage P, with its drums O, O, endless band Q, and bobbins E, slowly toward the hinder part of the machine, so as to cause the rovings or slubbings to be wound in helical coils.

A double inclined plane *o*, is attached by an arm to the back rail of the carriage P; and when the carriage, by its wheels *f*, *f*, rolling upon the rails *g*, has reached its destination, the inclined plane coming in contact with the under part of a weighted lever *p*, raises that lever for the purpose of throwing the other screw-shaft *m*, into gear with the pinion *k*, in order to reverse the movement of the carriage.

The means whereby this is effected will be best understood by reference to fig. 8, which shows the apparatus in the same position as fig. 5; but the end of the frame *n*, is in this figure removed to exhibit the interior. The two screw-shafts *l*, and *m*, are mounted horizontally in the frame *n*, upon excentric pivots, and a strap piece *q*, screwed to their ends, connects them. By these means the shafts *l*, and *m*, are enabled to rock to and fro upon their pivots, but not to revolve; and it is by giving to these shafts at certain periods vibratory lateral movements, that the pinion *k*, is enabled to act first in the screw of one shaft to send the carriage back, and then in the screw of the other shaft to bring it

A small double-armed lever *r*, is fixed to the end of the shaft *l*; one arm of which lever is drawn by the helical spring *s*, and the other arm of the lever is acted upon by a snail or escapement wheel *t*, fixed upon the end of a lower horizontal shaft *v*, *v*, mounted in the frame *n*. Round the middle part of this shaft *v*, (as may be seen in fig. 6,) a weighted cord *u*, is wound, for the purpose of drawing the shaft round in one direction, like the going-barrel of a clock. This shaft *v*, *v*, for some distance at each end, is formed with a screw-thread; the periphery of the screw, however, is not cylindrical, but notched or grooved into ratchet teeth, which may be perceived in fig. 8; and the end of the shorter arm of each of the levers *p*, *p*, near their fulcrums, are formed with a tooth or pall, intended to drop into the ratchets upon the screwed parts of the shaft *v*, in order to prevent the shaft turning.

It will now be perceived that whenever the inclined plane *o*, by the movements of the carriage P, P, is brought (as before described) under either of the weighted levers *p*, that the longer arm of that lever will be raised, and, consequently, the pall, at its reverse end, will be withdrawn from the ratchet of the shaft *v*: the weighted cord *u*, will then draw the shaft *v*, and the snail or escapement wheel *t*, round; and one of the points of the escapement wheel then acting against the longer arm of the double lever *r*, that lever will be forced back, and the screw-shaft *l*, be brought into gear with the pinion *k*, as in fig. 8.

The carriage P, will now be made to move towards the back of the machine until the inclined plane *o*, is brought under the other lever *p*, when that lever will be raised as the former, and its pall, by releasing the ratchet, will allow the shaft *v*, and the escapement

wheel *t*, to be drawn further round by the weighted cord *u*. The click or pall of the first-mentioned weighted lever *p*, will now fall into the rachet of the barrel *v*, and stop its rotation half way between two teeth of the escapement, which will allow the spring *s*, to draw down the shorter arm of the lever *r*, and thereby withdraw the screw-shaft *l*, from the pinion *k*, and bring the other screw-shaft *m*, into gear with that pinion; by which means the carriage will then be made to move toward the front of the machine by the rotation of the pinion, as described before.

If the carriage P, in advancing and receding, travelled along its railways *g*, through the same extent of space, every time during the process of filling the bobbin, then the rovings or slubbings should be wound on to the bobbins, barrels, or spools, in the forms of cylinders, with flat ends; but as it is desirable, for the convenience of the after process of spinning, that the rovings or slubbings should be laid round the bobbins in the forms of cylinders with conical ends, it is necessary gradually to diminish the extent of the traverse of the carriage, which will prevent the successive layers of the material from being wound to the same extent along the bobbin as the previous layer, and consequently produce the figure of a cylinder with conical ends.

To effect this object, the weighted levers *p*, *p*, must, as the process of winding on proceeds, be brought gradually nearer together, in order that the inclined planes *o*, may act against them, and change the traverse motion of the carriage more frequently. This is done by the following means:—

Each of the weighted levers *p*, *p*, is attached by a fulcrum pin to a sliding block or nut *w*, *w*: which blocks

are intended to be conducted along the shaft *v*, by a tooth taking into the thread of the screw upon the shaft; and they are retained in their positions as they slide by a foot, bearing upon a guide rod *x*. The threads of the screws formed towards the ends of the shaft *v*, are cut in opposite directions; the one being what is commonly called a right-handed screw, and the other a left-handed screw. A pin *y*, is passed through each of the blocks *w*, the point of which, as a tooth, takes into the worm of the screw; and hence, as the shaft *v*, is turned round by means of the weighted cord *u*, and escapement *t*, as before described, the teeth *y*, *y*, being acted upon by the right and left-handed screws, as they revolve, cause the blocks with the levers to be slidden gradually nearer together, which will necessarily restrict the traverse of the carriage in the way described, and produce bobbins full of rovings or slubbings of cylindrical forms with conical ends.

The third head of this invention, the peculiar modification of the rubbing surfaces for giving compactness or tenacity to the rovings or slubbings of cotton or wool, is represented in figs. 9, and 10. Fig. 9, is a partial plan or horizontal view of a machine, the parts of which are arranged and constructed to suit the improved modification of the rubbing surfaces; and fig. 11, is a transverse section, taken through the middle of the same. It will not be necessary to explain in detail all the parts of this machine, as they are the same in principle as the parts of the machine already particularly described, but some of them are differently arranged.

A, A, A, are the drawing rollers, through which the rovings pass to be elongated, and from whence they proceed to the rubbing surfaces; B, B, are two long cylindrical rollers, distending an endless band of lea-

ther C, C; D, is a larger cylindrical roller, of equal length to the former; the surface of which is covered with leather, and it bears upon the upper surface of the endless band C. The rovings or slubbings are conducted from the drawing rollers between the surfaces of the band C, C, and roller D, and proceeds thence through guide eyes to the bobbins, spools, or barrels E, E. Rotary motion is given to one of the rollers B, by toothed gear F, from the axle G, on which the rigger is placed that actuates the drawing rollers, and drives the other parts of the machine. The roller B, being thus made to revolve, the endless band C, will travel round the two rollers, and by the friction of the surfaces, the roller D, bearing upon it, will be made to revolve also, and carry the rovings through from the drawing rollers toward the bobbins.

In order, however, to give compactness or tenacity to the rovings or slubbings as they pass both the endless band C, and also the cylindrical roller D, are made to slide to and fro laterally in opposite directions. This is effected by means of a bridle H, attached to the axle of the roller D, and a rod I, attached to the carriage of the rollers B, B, both of which are connected to excentrics J, and K, on the transverse shaft L, L. By these means, when the machine is put in action by communicating rotary power to the rigger and shaft G, the endless band C, C, and roller D, will be made to slide to and fro laterally; and at the same time, by rolling together the fibres of the cotton or wool as they pass, will give that compactness or tenacity to the rovings or slubbings, which will allow them to be wound upon the spools, bobbins, or barrels E, E, E, below.

In order to wind the rovings or slubbings on to the bobbins in regular helical coils, an apparatus, exactly

like that described under the second head of the improvement, is appended to a sliding carriage M, M, having endless bands, giving rotation to the bobbins, spools, or barrels; and which carriage is moved to and fro on wheels upon railways by the means, and exactly in the same manner, as already explained.

A variation in the arrangement of the machinery, but embodying some of the same principles, is shown in the transverse sectional view, fig. 11, of another machine, designed to deliver the rovings or slubbings into cans. A, are the drawing rollers, from whence the rovings or slubbings are passed between the rubbing surfaces C, D, and are thence conducted between the back rollers Z, Z, down to cans Y, below. Most parts of this machine will be understood from the description of the former.

The drawing rollers A, are actuated from a rigger and shaft, and which, by means of similar gear and other appendages, produces the rotary and lateral movements of the rubbing surfaces, as described in reference to figs. 9, and 10. A pulley N, upon the end of one of the shafts of the drawing rollers, carries a band, which is also passed over a rigger O, fixed upon the end of the axle of one of the guide rollers Z; and by means of which pulley and band this guide roller is driven, and the two rollers Z, Z, being connected by a pair of toothed wheels, turn simultaneously in opposite directions, and conduct the rovings or slubbings into the cans below. In order to enable the rovings or slubbings to be distributed uniformly in the cans as they descend, the platform P, upon which the cans are placed, receives a traverse motion to and fro by means of pinions Q, which take into racks on the upper edge of the sliding arms R. The front part of this platform

is supported by wheels S, S, running upon railways T, T, extending from the standards of the machine, and the back part slides upon anti-friction rollers. The pinions Q, are fixed upon the axle of a reciprocating mangle wheel V, driven by a pinion U, upon the end of a rocking shaft W: which shaft receives its motion from a cord or band, connected with a pulley on the rigger-shaft; and hence, as the mangle wheel revolves with a reciprocating motion, the racks with the platform and cans are moved to and fro.—[*Inrolled in the Rolls Chapel Office, December*, 1834.]

Specification drawn by Messrs. Newton and Berry.

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*To* THOMAS MARTIN, *of Withby Bush, in the parish of Rudbaxton, in the county of Pembroke, clerk, for his invention of certain improvements in engines or machinery for cutting or preparing slates, or other similar substances or materials, for various useful purposes.*—[Sealed 3d July, 1834.]

THIS invention of certain improvements in engines or machines for cutting or preparing slates, or other similar substances or materials, consists in an improved construction of engines, machines, or apparatus, for cutting, shaping, or forming pieces or slabs of slate, or such other materials, into the required size and form, for various useful purposes; and which improved engine, machine, or apparatus, consists of moveable blades or cutters acting against fixed counter-beds or blade, mounted on the edges of tables, upon which the pieces or slabs of slate, or other materials, are placed to be operated upon: each of which tables have adjustable

rests or stops for determining the width or length of the slate. The moveable cutters are placed in frames, moving vertically up or down on parallel guides, and are actuated by cranks and connecting rods, chains, or ropes and pulleys, in the manner hereinafter described.

Figs. 1, and 2, in Plate XIV., are representations of one of these improved engines, machines, or apparatus for cutting slates, which is constructed as a double machine, that is, with four sets of cutters, and is intended to be actuated by manual labour, steam power, or any other first mover, communicating motion to the main shaft or axis, by winch handles, toothed wheels, bands, and riggers, or in any other convenient manner. Fig. 1, is an elevation of one side of the machine, showing the moveable cutters in the act of descending to cut off the required portion from the piece or slab of slate, or other material. Fig. 2, is an end view; and fig. 3, is a plan view of the same. The same letters of reference are used to denote similar parts in all the figures: *a*, *a*, is the framework of the machine and platforms upon which the persons attending it stand; *b*, *b*, *b*, *b*, are the stationary tables, upon which the pieces or slabs of slate, or other material intended to be operated upon, are placed, having the counter or fixed blades *c*, *c*, on their inner edges; *d*, *d*, are the moving cutters or blades, which are mounted at proper angles in frames, and receive their motion in the following manner: *e*, is the main shaft or axle, turning in plummer boxes or bearings on the cross bars of the framework; *f*, is a toothed wheel, mounted on its end, which receives rotatory motion by the winch handles and pinions *g*, *g*, or in any other convenient manner. On the shaft *e*, are the cranks *h*, *h*, which communicate a reciprocating rotatory motion by the connecting rods *i*, *i*, to the cross heads or beams

*k*, *k*, upon the shaft or axle *l*, which shaft is also mounted in bearings upon cross bars at the upper part of the framework: upon this shaft or axle are mounted the large wheels or pulleys *m*, *m*, with the chains or ropes *n*, *n*, passed over and connected to them. The ends of these chains or ropes are attached to the bars *o*, *o*, which carry the frames *p*, *p*, of the several moveable blades or cutters *d*, *d*, *d*. These frames are kept in their proper positions by the bearing *q*, *q*, at their sides, which slide up and down the guide rods *r*, *r*, as they are moved by the chains. These cutter-frames are each again connected to the one placed on the opposite side of the machine, by the chains or ropes *s*, *s*, which are attached at their ends to the lower rails of the frames *p*, *p*, and are passed under pulleys *t*, *t*, turning in bearings at the bottom part of the framework, thereby forming with the cutter-frames an endless connexion round the wheels *m*, *m*, and several pulleys *t*, *t*.

The guides are *u*, *u*, against which the edge of the pieces or slabs of slate or other material rest while under operation; the surplus part, or that to be separated from the slate, projecting over the edge of the table and counter-blade *c*, *c*, and under the moving cutter *d*, *d*. The ends of the guides or rests are formed into dovetailed pieces *v*, *v*, which slide in corresponding grooves between the pieces *w*, *w*, fixed on to the sides of the tables. These guides or rests are adjustable by the screws *x*, connected to them at one end, and passed through a corresponding female screw *y*, fixed on the table; these screws are turned by small winch handles on their ends: *z*, *z*, are guide rods for the screws, moving in staples on the under side of the tables; by these means, the guides or rests *u*, *u*, can be moved further from or nearer to the edges of the counter-

## Martin's Machine for Cutting Plates

Fig 1

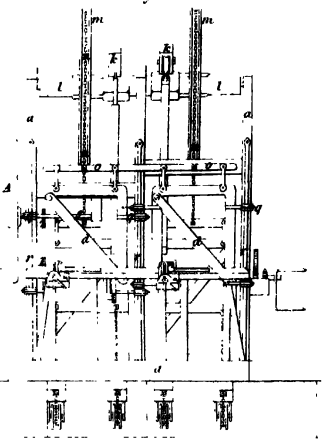


Fig 2

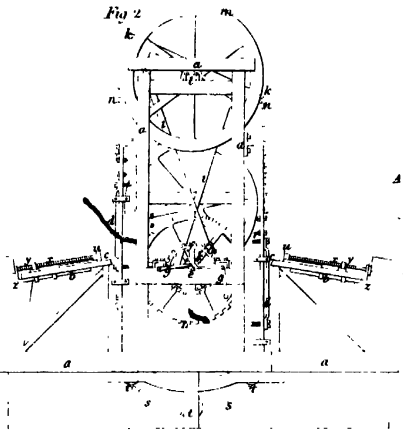


Fig 3

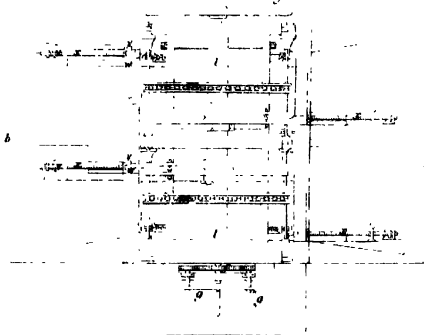
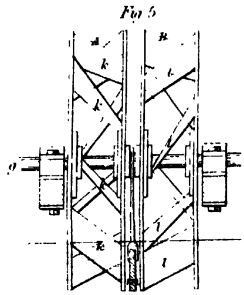


Fig 5



## Galloway's Propelling Machinery

Fig 4

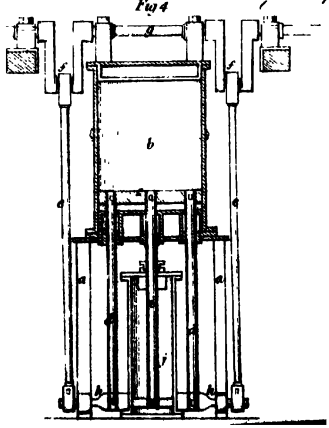


Fig 6

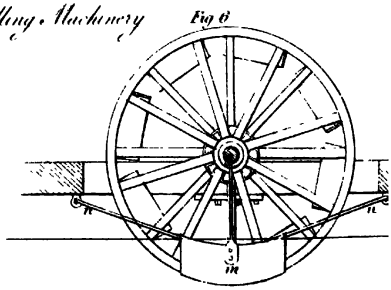
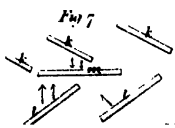


Fig 7



blades, to suit the width or length of different sized slates. Upon the other end of the main shaft or axle *e*, is mounted a toothed wheel 1, which takes into gear with a toothed pinion 2, on the inner end of the axle 3, on the reverse end of this axle there is placed a fly wheel 4, to overcome the dead points in the revolutions of the cranks, and render the motion of the machine more uniform.

Having now described the particular construction and arrangement of the parts of one of these improved machines or engines, we shall proceed to explain its operation. The person attending the machine places the pieces or slabs of slate, or other material, upon the tables holding them thereon, when the moveable cutters descending will cut off the superfluous part on one side of the piece of slate, and form a straight edge: on the cutters again rising, the attendant then reverses the position of the piece of slate, placing the straight edge against the guide rest *u*, which has been previously adjusted to the proper width the slate is intended to be made; the cutters again descending will cut off the opposite portion, and form the two sides of the slate parallel to each other. In this state the slates may be passed to the person stationed at the next pair of cutters, when the same operation may be performed, to cut the two ends of the slates at right angles with the sides, and also of a proper length, the guide *u*, of the second pair of cutters being previously adjusted for the length of the slates; or the pieces of slate may be first cut on one edge, and then that edge placed against the pieces *w*, *w*, the blades will then cut them at right angles, when they may be sorted for different sizes; the guides of one pair of cutters being adjusted to the required length and breadth: the right

angles of the slates are to be placed in contact with them, when the other edges will be operated upon. It will be seen that as the cutters on one side of the machine are in the act of cutting the slates, those on the reverse side are in the act of rising ready for the next operation.

Having described the construction and operation of this improved machine, the Patentee remarks, that only one crank and connecting rod and beam would give the same motion to the chain pulleys *m*, as above described, but that he prefers having two in a double machine. In this case it is necessary that one of the rods *i*, should be connected to the beam *k*, by a link and hinge joint, which is shown at 5, in the figures. And he further remarks, that the up-and-down motion given to the cutter frames might be communicated to them by cranks and connecting rods placed immediately above or below them, without the intervention of the beam, chain, pulleys, and shaft, as shown in this double machine.—[*Inrolled in the Rolls Chapel Office, September*, 1834.]

Specification drawn by Messrs. Newton and Berry.

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*To* JOSEPH WHITWORTH, *of Manchester, in the county palatine of Lancaster, machinist, for his invention of certain improvements in machinery or apparatus for cutting screws.*—[Sealed 27th February, 1834.]

THESE improvements in machinery or apparatus for cutting screws, consist in an improved construction of hand stock or frame for holding the cutters or dies which form the thread, and in the mode of forcing up the dies or cutters simultaneously for cutting the screws;

and, secondly, in the improved construction of a machine, by means of which, cutters acting upon a similar principle may be made to produce threads upon cylindrical shafts of the length and diameter required by a steam-engine, or other moving power.

The means by which the dies can be made to move simultaneously, admit of considerable variation in the arrangement and construction of the parts by which that result is attained; the Patentee has, therefore, shown, in the drawings accompanying his specification, several different methods of obtaining that result, which, although differing in detail, effect the same movement of the cutters or dies.

Fig. 1, Plate XV., represents the external appearance of one of these improved construction of hand-stocks, with the dies shown in their proper places. Fig. 2, is an edge view of the same. Fig. 3, exhibits the interior of the stock, the cover of the box being removed to expose the parts, and shown reversed at fig. 4. Fig. 5, is a longitudinal section, taken through the middle of the stock when complete, as in fig. 2: *a*, *a*, *a*, are the dies, accurately fitted into grooves, formed partly in the box *b*, *b*, and partly in the cover *c*, *c*, which enables them to slide in radial directions; *d* is a wheel placed within the box, and turning in a circular recess, formed in the box and cover, this wheel has oblique teeth cut in its periphery; and *e*, is a tangent screw, introduced into a cylindrical recess, also partly in the box and partly in the cover. The threads of this screw take into the teeth on the edge of wheel *d*; and, consequently, on giving rotation to the screw *e*, the wheel *d*, is driven round. Three excentric curved recesses *f*, *f*, *f*, are cut in the interior of the wheel *d*, which curves respectively bear against the back parts of the dies *a*. It will be perceived that by turning the tangent

screw *e*, the wheel *d*, will be driven round; and that by the smaller radic of the curves *f*, coming against the backs of the dies *a*, they will be simultaneously forced inwards.

The improved construction of machine or engine for cutting screws by power, is shown in figs. 6, and 7. Fig. 6, is a plan or horizontal representation of the machine. Fig. 7, a longitudinal elevation of the same, partly shown in section; and fig. 8, an end view, in which several figures similar letters point out corresponding parts. A, A, is the bed or frame of the machine, constructed somewhat like the bed and slide frame of a lathe, with fixed standards B, B, in which the main shaft C, revolves, and at the same time slides longitudinally. A toothed wheel D, is connected to the shaft C, by a key passed through its boss; which key takes into a longitudinal groove cut along the shaft, and shown in fig. 7. Hence it will be perceived that though the wheel D, is so connected to the shaft as to communicate rotary motion thereto, yet the shaft is permitted to slide longitudinally within the boss of the wheel D. Rotary motion is given to the wheel D, by a pinion E, fixed upon the auxiliary shaft F, F; which shaft is supported in bearings with plummer blocks on a lateral frame G, G, shown best in the horizontal view, fig. 6. This auxiliary shaft has two pulleys, H, and I, turning freely upon it: and to each of these pulleys a clutch-box is affixed, with a sliding clutch K, between them, and a tumbling lever L, for the purpose of locking either of the pulleys to the shaft, in order that the shaft may be turned in contrary directions, as circumstances may require. This part of the machine will be best understood by reference to the detached figure 9, which is a partial elevation of the auxiliary shaft and its appendages. From the pulleys

H, and I, bands M, M, one of them being crossed, extend to corresponding pulleys, fixed upon a shaft N, above; which shaft being driven by the power of a steam-engine, or any other first mover, gives rotary motion through the bands M, M, in contrary directions to the pulleys H, and I; and according to the position in which the trip lever L, is placed, as shown by dots in the last-mentioned figure, so will the shaft be locked to one of the pulleys, and be made to revolve in either direction; or the clutch being in the central position, and unlocked from either pulley, the shaft will remain quiescent.

The face of the box or holder containing the screw dies, is shown at P, in figs. 6, 7, and 8; it is fixed to a frame Q, which is capable of being slidden upon the edge rails of the bed A, A, and of being made fast to the bed by screw-bolts. The dies contained in this box are worked upon a similar principle to those described under the first head of the invention, but their construction is in a slight degree varied.

The blank shaft or cylindrical piece upon which the screw is intended to be cut, is shown at R, in figs. 6, 7, and 8, one end of it being made fast in the universal chuck-holder S, which is fixed to the end of the main shaft C; by the rotation and sliding longitudinal movement of which shaft the screw-blank is passed through the dies, and thereby the worm or thread is cut round its surface. The progress of the main shaft C, in its longitudinal movement, is dependant upon a leading screw T, the axis of which is coincident with the axis of the main shafts; and they are connected together at their extremities by the end of the screw T, being inserted into a socket in the end of the main shaft, confined therein by a flange and collar, as shown

by dots in fig. 7, thereby allowing the shaft C, to revolve independently of the screw T. The screw T, passes through a screw box U; which box turns freely in the neck of the bearing V, and is made to revolve by the toothed wheel W, fixed upon it. The object of which is, that rotary motion may be given to the screw-box U, instead of turning the screw T itself, in order that the screw with the shaft C, may be made to slide longitudinally. By this contrivance a screw T, of any convenient pitch of thread, may be employed to conduct the main or sliding shaft for cutting any desired pitch of screw upon the blank shaft R; and the progress longitudinally of the screw T, and sliding shaft C, which determines the rake or obliquity of the screw or thread to be cut upon the shaft, may be regulated by varying the diameters of the train of wheels connected to the auxiliary shaft F, and wheel W, by which the screw-box U, is driven: for, according to the rotary speed of the screw box U, so will the guide or leading screw T, and the shaft C, be made to advance longitudinally; and as the rotary speed of the screw-box is increased or diminished, so will the rake of the screw be more or less obliquely cut upon the blank shaft R.

In order to limit the extent to which the thread shall be cut by the dies upon the blank shaft, adjustable stops X, X, are placed upon a sliding bar, which advances with the sliding shaft; and at the proper times, according to their adjustment, these stops act upon the trip lever L, and throw it over, so as to move the clutch, and reverse the direction of the longitudinal movement. Fig. 10, shows the internal construction of the box or frame containing the dies or cutters *a*, *a*, *a*; the stems of which in this instance fit in cylindrical holes, formed radially in the inner ring-piece,

shown detached at fig. 11; and the hinder parts of the stems of the dies are acted upon by the curved excentric recesses *y*, *y*, *y*, formed in the outer ring of the box, as shown in fig. 10. There are also curved excentric ribs *z*, *z*, *z*, placed parallel to the curved recesses, which act in notches cut in the under sides of the stems of the dies.

It will now be evidently perceived, that by the inner ring being fastened to the frame Q, as shown in the section, fig. 7, with the outer ring sliding round upon it, that by giving to the outer ring a partial rotary movement, by means of a weighted lever Y, the dies will be made to approach toward, or recede from, the centre. Fig. 12, shows the cover of the box removed.

If it should be thought desirable, the frame Q, with the box P, and cutting dies, might be made to travel on the bed A, A, during the time the thread of the screw is being formed on the screw-blank R. In this instance shaft C, and screw-blank R, would revolve without moving longitudinally, and the frame Q, and dies, be moved by a leading screw passed through a screw-box on the frame Q; the rotary motion of the leading screw would be communicated from the shaft F, in the same way as that described from the screw-box U, or in any other convenient manner.

Figs. 13, and 14, are representations of another method of effecting the same movement of the cutters or dies by inclined planes or wedge-pieces, instead of the excentric grooves before described. Fig. 13, is an internal view of the box or holder of the dies, the front plate being removed. Fig. 14, is a section of the same complete: *y*, *y*, are wedge-shaped pieces, placed in mortices in the box or holder, the inclined planes of which act against the ends of the stems or blocks con-

taining the dies. There are projecting pins or studs upon these wedge-pieces, which work in slots, formed in the front plate, which is shown detached in fig. 15. On turning this plate partly round, the slots, by the connexion with the wedge-pieces, will move them forward, and force the dies inward. Figs. 16, and 17, are representations of another method of effecting the simultaneous movement of the dies by means of levers; and which arrangement will also draw back the dies when required: $y, y$, are bent levers, the ends of which work in grooves, formed in the stems or holders of the dies: these levers have their fulcrums on pins in the box or holder; their other ends having projecting studs, which work in the slots in an outer ring, as before described. On turning the ring partly round in the direction of the arrow, the lever will be made to force the dies forward; and on turning it the reverse way, they will be drawn back into the former position. Figs. 18, and 19, represent another method of obtaining the same movement of the dies by means of screws and wheel and pinions; $y, y, y$, are screws, formed on the ends of the stems or holders containing the dies, having bevelled pinions, with screws cut in the bosses working upon them. The bosses of the pinions are kept up to the inner ring by a groove and pin. There is a longitudinal groove cut in the stems or holders, with pins working in them, to prevent their turning round, and there is a bevelled toothed wheel working on a projection on the inner ring, which wheel takes into the several pinions; and on turning this wheel backward or forward, the pinions will be made to revolve, and by their movement will force outward or inward the dies.

Having described these improvements in machinery or apparatus for cutting screws, the Patentee states, in

Whitworth's Impt.ⁿ in Cutting Screws

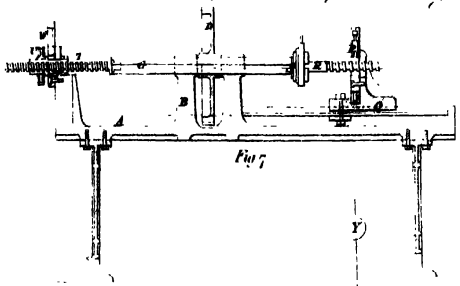


Fig 7

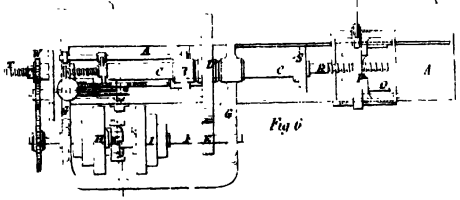


Fig 6

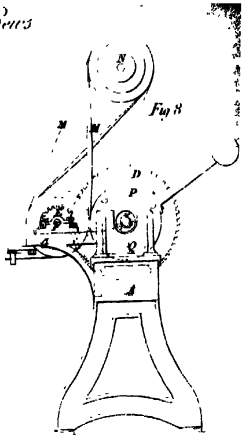


Fig 8

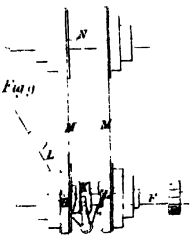


Fig 9

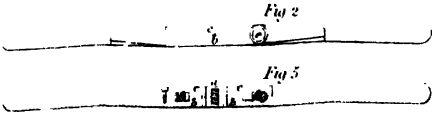


Fig 2

Fig 5



Fig 1

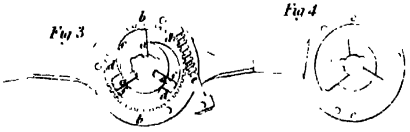


Fig 3

Fig 4

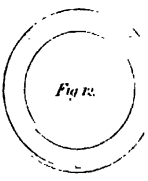


Fig 12

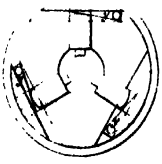


Fig 13

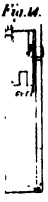


Fig 14

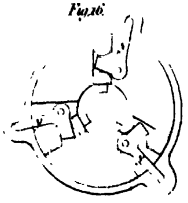
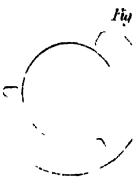


Fig 16



Fig 17



Fig

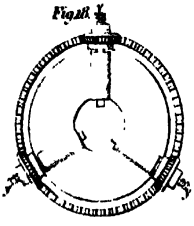


Fig 18



Fig 19

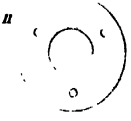


Fig 11



Fig

conclusion, it will be evident that the same is applicable to the cutting or forming threads of various kinds of screws, particularly those used in lathes, vices, or jacks, and also to machinery or apparatus for screwing bolts, or for forming what are called wood-screws; and that he claims particularly as his invention, the manner of bringing the several dies forward simultaneously in their improved stocks, holders, or frames, by the means and for the purposes above described.—[*Inrolled in the Rolls Chapel Office, August*, 1834.]

Specification drawn by Messrs. Newton and Berry.

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*To* ELIJAH GALLOWAY, *of Carter-street, Walworth, in the county of Surrey, engineer, for his invention of improvements in steam-engines and apparatus for propelling.* —[Sealed 7th November, 1832.]

THE Patentee describes this invention to consist in improvements in marine steam-engines, and in paddle-wheels for propelling vessels: the first improvement consisting in employing three piston rods to one steam cylinder, two of which rods are intended to communicate motion from the piston to the paddle-wheel shaft, and the third rod is intended to work the piston of the air-pump of the condenser. The second improvement consists in placing two sets of paddles side by side, the paddle-boards being set at oblique angles to their shaft, and also at oblique angles to each other, and not standing opposite each other, but equi-distant; consequently, they enter and leave the water in succession.

Between these two sets of paddles is placed a board,

called the dividing plate *m*, which board is intended to prevent the water from being forced from the paddles laterally; and, by this arrangement, each paddle or float-boards will enter and leave the water at an angle, for the purpose of preventing concussion on their entrance into the water at the commencement of their stroke. And, further, the paddles will not lift the back-water on their leaving it: but the dividing plate preventing the water from moving laterally from the paddles, they will have as full an action on the water, as if they were placed parallel or in a line with their shaft; thus when the paddles pass the end of the dividing plate, their angular surfaces are only presented to the water, consequently they glide easily out therefrom without lifting back water.

The first part of this invention, shown in Plate XIV., *fig.* 4, is a sectional elevation of the steam cylinder, with the principal parts of an engine constructed according to these improvements: *a*, *a*, is the framing which supports the engine; *b*, the cylinder; *c*, the piston; *d*, *d*, the two piston rods, passing through stuffing-boxes in the lower cover of the cylinder, and communicating the power by means of the connecting rods *e*, *e*, to the cranks *f*, *f*, upon the main shafts *g*. These two piston rods *d*, *d*, are connected by the cross-head *h*, which is bent or curved so as to be free to move up and down outside of the air-pump; *i*, is the third piston rod, connected to the centre of the piston, which works the air-pump *j*, of the condenser. The construction of the other parts of the engine are so well understood, that it is not necessary to give any further description of them, they forming no part of this invention.

The Patentee states, that his object in employing

the three piston rods is to admit of the air-pump being brought immediately under the steam cylinder, where it can be worked by one of the piston rods, whilst the placing of the air-pump in this situation does not lengthen the other piston rods, and, consequently, does not increase the height of the engine, the cross-head being curved or embracing the air-pump, and working up and down without interfering with it.

The Patentee states, that by this arrangement many of the working parts heretofore employed in marine engines may be dispensed with, and a considerable saving of space and weight of metal will be obtained, which is desirable in marine engines; and further, that by the peculiar arrangement of the float-boards of the wheels, described under the second head of this invention, these engines may be used as single engines, these improved paddle-wheels not being so liable to be struck back by any description of sea, consequently they will act as fly-wheels to the engine, thereby rendering two engines unnecessary.

The improvement in propelling vessels, which constitutes the second head of the invention, is shown in Plate XIV., at figs. 5, and 6, in two positions: fig. 5, is an edge view of a double wheel with oblique paddles, inclining in opposite directions in the two conjoined wheels, and fig. 6, an elevation taken between the wheels.

The main shaft *g*, of the engine carries a pair of these conjoined wheels A, and B, at each end. The oblique float-boards of the one wheel A, inclining in an opposite direction to that of the other.

Fig. 7, is a diagram representing the edges of the float-boards in the positions they would assume under the surface of the water, and the arrows point out the directions in which the water would be thrown from the

paddles against the partition *m*, placed between the two conjoined wheels.

It will be perceived that the rims of the two wheels A, and B, are not brought close together, there being a small space to admit of the dividing plate *m*, being placed between them, which is securely affixed by the bars or rods *n*, *n*. The dividing plate extends about one-eighth of the circumference of the wheels, and, as before stated, is intended to prevent the water being forced laterally from the surface of the float-boards till they have passed the end of the dividing board.

The Patentee states, it will be evident that the float-boards, during the time the water is so restrained from lateral motion, will act as powerfully as if they were placed in a line with their shaft; yet, when the float-boards pass the end of the dividing plate, they will no longer hold the water, but will force it away laterally, and come out of the water without raising it: whereby the back water, heretofore so much complained of, will be got rid of, and the paddles, entering the water at an angle, will avoid those concussions to which the common paddle-wheels are subject, and which are so prejudicial to the vessels and machinery.

Instead of having two separate wheels, these improvements may be applied to one wheel, with two sets of these angular paddles, and the middle spokes or arms be made forked, leaving sufficient space between the forks and paddles for the dividing plate to be placed, as before described.

The Patentee states, in conclusion, he is aware that paddle-wheels have before been constructed, having their paddles set at an angle to the shaft: he, therefore, does not intend to claim the using paddles or float-boards placed in angular positions, neither does he

claim separately the various parts of which the steam-engine above described is composed; but claims as his invention, firstly, the constructing marine steam-engines having three piston rods, two of which communicate the power from the piston to the shaft, as above described, and the other working the air-pump; secondly, the constructing of paddle-wheels, having the paddles set at an angle to each other, and having a dividing board or plate to prevent the water being forced laterally away from them, so long as the float-boards are intended to be in action, as above described.—[*Inrolled in the Inrolment Office, May*, 1833.]

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*To* JAMES BOYNTON, *of High Holborn, in the county of Middlesex, portable inkstand-manufacturer, for his invention of improvements in apparatus, or means of producing light.*—[Sealed 18th January, 1834.]

THE invention described in the specification of the above patent consists in an improved method of stopping the mouths of the bottles which contain the acid of an ordinary instantaneous light apparatus. It is well known that in the common apparatus for producing instantaneous light by dipping a match into acid, when the cover or stopper of the acid bottle is left off for any length of time, the effective property of the acid is destroyed by the moisture of the atmosphere; and from the destructive properties of acids on most articles, it is necessary to construct the stopper of some substance, which is not prejudicially acted on by the acid. The present improvement is intended to obviate both these objections; and consists, first, in the application

of quicksilver as a covering to the acid, for the purpose of preventing the action of the atmosphere upon it, at the time the bottle or other vessel is uncovered; and, secondly, in the application of talc, as a covering or stopper to the said bottle.

Fig. 14, Plate XIV., is a section taken through an ordinary apparatus for producing instantaneous light: *a*, is the box for containing the matches; *b*, its cover. In the top of the cover is inserted the acid bottle *c*; and having a tube *d*, formed in its mouth, for the purpose of preventing the quicksilver from running out of the bottle, in the event of the apparatus being turned over: *e*, is the quicksilver, lying on the top of the asbestus, which as a sponge, holds the acid in a liquid state below.

The stratum of quicksilver thus floating on the surface of the asbestus and acid, will effectually exclude the atmospheric air, and prevent moisture insinuating itself into the acid. In using this apparatus, the match is to be dipped quickly through the quicksilver, and instantly withdrawn; the quicksilver giving way to the match, and flowing back, and again covering the acid when the match is removed, thereby preventing the atmosphere from acting on the acid: *g*, is the cover of the bottle, tightened by a screw.

The second improvement, viz. the application of talc, as a cover or stopper to the bottle, is also shown in fig. 14: *i*, is a disc of talc, fixed in to the top of the cover *g*, of the bottle, and which is kept in contact with the mouth of the bottle or vessel containing the acid, the bottle being constantly pressed upwards by the spring *i*; a disc of foil or thin metal is placed on the talc, and there is a piece of cork *k*, which forms an elastic back to the talc cover or stopper.

Having described the nature of these improvements, the Patentee proceeds to state that he does not claim as his invention any of the parts separately; and, further, that he does not confine himself to any pattern or shape of the boxes, or cases of the apparatus; but that he confines his claim of invention, firstly, to the application of quicksilver as a covering to the acid, for the purpose of excluding the action of the atmosphere from destroying the effective properties of the acid when used, for the purpose of producing instantaneous light; and, secondly, the application of talc as a cover or stopper to bottles or vessels containing acid, when used for the said purpose.—[*Inrolled in the Inrolment Office, July*, 1834.]

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*To* WILLIAM SEPTIMUS LOSH, *of Walker, in the county of Northumberland, gentleman, for his invention of an improved method of bleaching certain animal fats, and certain animal, vegetable, and fish oils.*—[Sealed 17th July, 1834.]

THE Patentee says, his invention consists in making the oils and fats or fatty matter to which the process is applicable miscible with water, in such manner as effectually to admit of the application of a solution of chloride of lime to bleach the same, and in the use of the said solution in manner hereinafter explained for that purpose.

I take a quantity of the oily or fatty matter to be bleached, and add to it one-twentieth of its weight of caustic potash, or soda, or one-twelfth of its weight of the carbonate or chloride of potash or soda dissolved in a quantity of boiling water equal in bulk to the

oily or fatty matter to be bleached, taking care to stir the mixture until it is perfectly uniform and free from knots. I then take chloride of lime of commerce equal to one-fourth of the weight of the said oily or fatty matter to be bleached; and having dissolved it in cold water in the proportion of six hundred gallons of water to one hundred-weight of chloride of lime, I draw off the clear solution from the residuum, and allow the clear and cold solution of chloride of lime to trickle slowly into the mixture before mentioned while it is still sufficiently warm to be in a liquid state, at the same time very carefully stirring the whole mass.

When this is done, the bleaching action speedily commences, and proceeds gradually during the addition of the cold solution of chloride of lime, and for some time afterwards, until the colour is sufficiently discharged.

The bleached oily or fatty matter I then put into some kind of boiler that will resist the action of sulphuric acid (I have found an ordinary iron boiler lined with lead answer the purpose perfectly well), and boil it in diluted sulphuric acid in the proportion of one part sulphuric acid of 120° strength to twenty parts of water, until it is freed from any of the lime or alkaline substance which may have combined with it during the bleaching process, and floats quite clear upon the top of the acid liquor, after which I draw it off into clean water to free it from any adhering acid or other impurities, and it is then ready for use.

Now, whereas the quantities and proportions of the substances hereinbefore given may be considerably varied, without materially affecting the process; but in the proportions before stated I have found the bleaching is very speedy and complete, and is applicable to

such oils as linseed, palm, whale, and seal, and to such fats as impure tallow, and what is commonly called grease or kitchen-stuff.

I claim as my invention the bleaching of such oils and fats or fatty matter as aforesaid, by combining the said oils and fats with water holding in solution an alkali and alkaline substance, then gradually mixing with the fluid mass so obtained a cold solution of chloride of lime in manner hereinbefore described, the subsequent processes of boiling in acid and washing in warm water being merely to free the bleached substances from the extraneous matter which has been imported into them by my method of bleaching.—[*Inrolled in the Inrolment Office, October*, 1834.]

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*To* JACQUE FRANCOIS VICTOR GERARD, *of Redmond-row, Mile-End, in the county of Middlesex, for an improvement applicable to the Jacquard looms, for weaving figured fabrics, being a communication from a foreigner residing abroad.*— [Sealed 19th October, 1833.]

THE Jacquard or Lyons' loom, for weaving figures or patterns in silk or other damask goods, substitutes in place of the labour of the ordinary *draw-boy;* an apparatus by which at every throw of the shuttle certain portions of the warp-threads are held down, and certain other portions are raised, in order to place such parts of the weft-threads upon the surface of the fabric, as, in the course of successive throws of the shuttle, shall produce upon the surface the desired pattern or damask figure.

This apparatus consisted of a series of horizontal

rods, each rod being respectively connected to one of the perpendicular cards or healds that lift the respective threads of the warp; and which horizontal rods being severally acted upon, that is, certain of them being slidden laterally, previous to every throw of the shuttle, caused certain of the warp-threads to be held down, while other portions of the warp were raised, and thereby that disposition of the threads effected, which produced the desired pattern.

The mode by which these horizontal rods were acted upon in the original Jacquard loom, was by preparing a series of cards or boards pierced with certain holes, corresponding to the positions of the ends of the rods; and on bringing these perforated cards or boards flat against the ends of the horizontal rods, such of the ends of the rods as were opposite to blank parts of the card or board were forced back by the pressure of the board, but those of the rods which were opposite to the holes passed through the perforated card. Thus a portion of the rods only were slidden laterally, and those parts of the warp connected with such rods being thus acted upon, the required disposition of the threads was made.

As, however, preparatory to every throw of the shuttle, a new disposition of the warp-threads was required, the several cards or boards were differently pierced in order to shift different rods; and for the purpose of bringing these cards into operation in proper succession, they were connected or strung together as an endless chain, and conducted by a square roller mounted in vibrating arms, which, by swinging, beat the roller with the card upon its face up against the ends of the rods before every throw of the shuttle, and in receding turned over the roller, and brought another card forward for the next operation.

Such was the original construction and operation of the Jacquard loom; and the invention which forms the subject of the present patent is, as the Patentee describes it, merely the "substitution of paper for the pasteboard cards now used in Jacquard looms."

We have given the preceding introduction, for the purpose of leading the reader to a more clear understanding of the objects proposed by the Patentee, which, in our opinion, the specification does not very evidently point out. The following is the Patentee's explanation, accompanied with a very crude representation of that part of a loom to which the improvement applies :—

"Plate XIII., fig. 11, is a side view of so much of a Jacquard loom as is sufficient to show the apparatus required to be added to it, for the purpose of substituting paper for the pasteboard cards hitherto used. The Jacquard machinery is mounted on a wooden frame: *a*, is the *lanternon* moved by the mantonet of the Jacquard; *b*, *b*, are four tappets acting upon the ratchet-wheel *c*. This ratchet-wheel is attached to the cylinder *d*, which cylinder must be as wide as the paper intended to be used, and must be furnished with a toothed band at each end; the teeth of which must take into holes pierced in the boarders of the paper for that purpose, so as to keep it in a uniform position.

"The paper is shown at *e*, *e*, *e*, and has the pattern read upon it, and it will be seen that the paper passes between the rollers *p*, *m*, the upper roller moving in a slot, and thus by its weight resting on the lower roller, acting as a sort of detent-roller to keep the paper straight.

"From the rollers *p*, *m*, the paper passes over the cylinder *d*, and thence between the rollers *r*, *s*; by which

arrangement it will be evident that if the paper be made exactly of the length required for the pattern, the two ends may be joined, and thus it will form an endless web, whereby the operation of lacing, which is required where cards are used, will be entirely superseded.

"In order to make so thin a substance as paper efficient, it is necessary to relieve it from the pressure of the needles as much as possible; and this is effected by means of the lever *h*, which turns on a pivot at *f*, and is moved up and down by the cams *i*, *i*, *i*, *i*, on the tappet-wheel striking the cross-bar *t*, at the bottom of the upright shaft *g*.

"This lever acts upon the lifting frame *j*, *j*, and raises the set of pins *s*, when required, above the grooves in the grooved block *k*, or lowers them so as to pass into the grooves at pleasure. The block *k*, thus answers the purpose of the pierced cylinder in the Jacquard loom.

"The needles *l*, fall into the recess in the cylinder *d*, when the holes in the paper allow of it; and it will be seen that each of these needles is supported by the eye or loop, at its upper parts.

"It must be evident that the paper, when used in this manner, will be liable to stretch and shrink, according to the moisture or dryness of the atmosphere: *o*, is therefore an apparatus for adjusting the needles *l*, so as to meet this difficulty. The position of it in the loom is shown, but its structure will be better seen by the figs. 12, and 13: the former of which represents a plan, and the latter an end view of the said apparatus, which I call the adjusting beam.

"This beam is composed of fifty-one pieces, and each bored with eight holes: these pieces are moved nearer together or further apart by wedges, *v*, *v*, at each end of the perforated piece. These wedges are acted

upon by the screw *z*, which has a right and left thread cut on it; and there should be one of these screws at each end of the beam, drawing the sides of the beam together.

"By means of these screws, a small tenant projecting from the wedges *v*, *v*, is forced into a groove made for it in the side-pieces, which thereby adjusts the pierced pieces, *u*, *u*."

The Patentee concludes by saying, "I do not confine myself to this particular apparatus for applying paper instead of pasteboard cards, because it may be done in many other ways, provided only that proper care is taken to avoid too much pressure on the paper by the needles, and to provide for the stretching and shrinking of the paper. But I claim as the said invention the substitution of paper, as hereinbefore described, for the pasteboard cards now in use for Jacquard looms."—[*Inrolled in the Inrolment Office, April*, 1834.]

## NOVEL INVENTION.

### STEAM-CARRIAGE.

Notwithstanding the cry of steam-coach has been so often reiterated by the public press for some years past, it is a remarkable fact that, at this advanced period of science, and after such a multitude of attempts, we really have not yet any vehicle impelled by steam moving upon any of our public roads, excepting, occasionally, some ephemeral invention, which, like a meteor, appears to astonish the world, and then is seen no more.

Without wishing to detract from the just merits which are due to every effort (even though unsuccessful) toward the accomplishment of so great an achievement in the arts, as the substitution of steam

power on ordinary roads, in place of horse labour, we cannot but express our surprise, that so little, which can really be called improvement, has been proposed in locomotive machinery.

With the exception of the various ingenious contrivances proposed by Dr. Church, of Birmingham, we know of nothing that has ever promised to improve locomotive engines; and these, we regret to say, the public are not yet benefited by.

We hear, however, that Dr. Church has completed his drag-engine—his steam-horse we may call it; and that he has for some short time past made daily excursions in the neighbourhood of Birmingham, drawing an omnibus filled with passengers. It is stated to us by disinterested parties, that the machinery has on these occasions operated in every way to the entire satisfaction of the company, on whose behalf the engine has been constructed. We are therefore in a situation to say, that something has in this instance been achieved, and which, we really think, holds out a fair promise of permanent usefulness.

At present, no more can, we think, be fairly said on the subject of Dr. Church's engine; but it is probable that our next may contain a further and more satisfactory statement of progress.

## List of Patents

*Granted by the French Government from the 1st of April to the 30th of June,* 1834.

PATENTS FOR FIFTEEN YEARS.

To Thomas Jarrold, of Manchester, represented in Paris by Mr. Perpigna, of the French and Foreign Office for Patents, 4, Rue Choiseul, for certain improvements in looms.

To James Perry, of London, represented in Paris by Mr. Perpigna, for improvements in pens and penholders.

— Joseph Catherine Bottex, of Dreux, represented in Paris by Mr. Perpigna, for certain improvements adapted to cars, carts, chariots, and mechanical wheelbarrows.

— Leon Castelain, of Bordeaux, represented in Paris by Mr. Perpigna, for a new method of making vinegar with a substance not hitherto used for that purpose.

— Louis Quantin, coach-maker, of Paris, for certain improvements in the construction of coaches.

— John Heathcoat, of London, for a new mode of draining and cultivating at the same time marshy lands, by means of an apparatus worked by a steam-engine, or any other motive power.

— Joseph Corrompt and Son, silk-manufacturers, of Lyons, for an improved method of spinning and milling silk threads.

— David Rowland, of London, for certain improvements in the construction of sextants, quadrants, and circles, used for the admeasurement of angles in astronomical and geodesical operations.

— Antoine Pierre Nicolas Puget, of Paris, for a steam generator applicable to steam-carriages.

— Miss Elizabeth Gervais, of Paris, for a mechanical apparatus for producing a perpetual and continual motive power.

— Joseph Claude Breugnot, of Paris, for a method of substituting zinc to lithographic stones.

— Camille de Rochefort, of Paris, for improvements in saddles.

— Xavier Jouvin, of Grenoble, glove-maker, for instruments for shaping gloves.

— Ambroise Brewin, of St. Quentin, for improvements in the bobbin-net frames.

— Henri Robert, for new chronometers.

— Alexandre Francois Selligue, of Paris, for an improved gas-light.

— Nicolas Tonnelier, civil-engineer, for a lever press with a rotatory motion.

PATENTS FOR TEN YEARS.

To Narcisse Brame Chevalier, of Lille, represented in Paris by Mr. Perpigna, for an apparatus for precipitating the syrup in the making of loaf-sugar.

— Charles Joseph Hullmandel, represented in Paris by Mr. Perpigna, for an improved method of transferring drawings on blocks or cylinders used for printing any kind of tissues.

— Antoine Perpigna, of the French and Foreign Office for Patents, 4, Rue Choiseul, for certain improvements in matches.

— James Ingrue, of Honfluer, represented in Paris by Mr. Perpigna, for a new combination of mechanisms to be employed as substitutes to paddle-wheels.

— Jacques Moinecourt, silk-manufacturer, of Lyons, for a new kind of velvet.

— Meens Vandermaclen, of Brussels, for a method of manufacturing artificial tissues.

— Pierre Richard, of Paris, joiner, for a method of dispensing with iron fastenings in joiners' work,

— Gilbert Brewster, of Rouen, for a new kind of mill calculated to grind corn and every pulverisable substance.

— George Skey, of London, for an improved method of preserving brass and other metals from oxydation.

— Louis Edme Bietre, of Paris, for an improved method of making the timber-work of a roof.

— Messrs. Rignon and Tradol, of Paris, for an improved kind of bellows.

— Jean Alphonse Chappuis, of Lyons, for a method of painting crapes and gauzes with a fast blue colour.

— Pierre Desiré Talbot, of Louviers, for certain improvements in carding machines.

— Hubert Mutel, of Paris, for a kind of salt extracted from the Vichy mineral waters, and to be used as common salt.

— Joseph George, of Paris, for a motive power produced by the simultaneous action of man's strength or weight.

— Raton Brothers, of Salins, for an economical method of pulverising plaster of Paris.

To Louis Constant Jullien, of Paris, for certain improvements in cocks.

— Jacques Antoine Frigério, of Paris, for certain improvements in the machinery used for manufacturing out of spurge laurel pease for issues.

— Jean Joncla, of Temautier, for an improved mill for grinding wheat.

— Aimé Victor le Roy Beaucousin, of Campeaux, for a machine for grinding and cutting optical glasses.

— Jean Clement Lambert, of Paris, for certain improvements in vapour-baths.

— Jacques Dominique Charles Gavard, of Paris, for a new pantograph.

— Joseph Henri, of Paris, for certain methods of imitating inlaid and mosaic work.

— Jaminet Cornet, of Paris, for an improved filtering fountain.

— Auguste Marie Herland, of Guerlesquin, or an improved thrashing-machine.

— Jean Nicolas Toussaint Delsarta, of Solesmes, for a method of preserving balm.

— Theophile Mignon, of Paris, for a new kind of wrought-iron chain for supporting the rails of rail-roads.

— Josue Heilman, of Mulhauson, for a flexible flyer used for winding on the warp in self-acting mules.

— Joshua Scholfield, of Birmingham, for improvements in the platen and in the priming of fire-arms.

— Leon Lefebvre, of Paris, for certain improvements in the manufacturing of chip bonnets for ladies.

PATENTS FOR FIVE YEARS.

To Denis Joseph Marie Helfenberger, of Bergerac, represented in Paris by Mr. Perpigna, for an improved press.

— Ambroise Marie Baudet, of Lyons, represented in Paris by Mr. Perpigna, for three geometrical instruments for taking plans and measuring distances without any calculation.

— Nicolas Perrin, of Paris, for a new kind of fastening for windows, blinds, &c.

To Louis Jullien Comperet, of Paris, for a new kind of vehicle with only one wheel.

— Antoine Toussaint Benigni, of Bastia, for improvements in steam-engines.

— Bourbin and David, of Havre, for a new kind of spear and harpoon for striking the whale.

— Jean Baptiste Benjamin Laignel, of Paris, for a new kind of inodorous close stool.

— Noel Victor Dominique Barbou, for a new kind of mechanism which he calls an indicator with bells.

— Auguste Agricole Decaen, for a new kind of oven for baking pottery.

— Jean Pierre Constant, of Marseille, for a new drag or lock for wheels of carriages.

— Louis Nicolas Edme Petit, of Paris, for a new kind of flooring.

— Rouen and Dressart, of Paris, for a metallic pencil and a prepared paper on which it is used.

— Jean Baptiste Cluesman, of Paris, for improvements in pianos.

— Caïman Duverger, of Paris, for a new kind of lamp.

— Monselas and Violet, of Paris, for an improved kind of soap.

— Victor de Bergue, of Paris, for a self-acting spinning machine.

— Alexandre Braconnier, of Arcis sur Aube, for improvements in hosiery.

— Boquet and Co., of Tassy, for a new kind of beverage called by them sparkling grog.

— Charles Louis Parrizot, of Paris, for improved platens for fire-arms.

— Francois Chabest, of Nismes, for a thrashing and winnowing machine.

— Jean Durand, for an improved stove for baking the agen plums.

— Kent Brothers, of Boulogne sur Mer, for a portable water-closet.

— Grezely and Labance, of Saulnaire, for the application of a fire-grate of their invention to steam generators.

— Benard and Traschsel, of Paris, for a new lithographic press.

ADDITIONAL SPECIFICATIONS INROLLED FOR IMPROVEMENTS BY THE FOLLOWING PATENTEES.

To Brame Chevalier, of Lille, represented in Paris by Mr. Perpigna, on his sugar-refining and evaporating apparatus.
— De Connick, of Denmark, represented in Paris by Mr. Perpigna, on his clinometer.
— Galy Cazalat, of Versaille, on his steam-carriage.
— Lebobe, on his metallic covering for houses.
— Vigireaux, on his patent clogs.
— Lassalle and Bellocq, on their improved fire-grates.
— Demony Perint, on his indigenous coffee.
— Huard and Foujie, on their new method of making paper.
— Gilles, on his heated arm-chair.
— Berniger, on his improved fire-arm.
— Scrive and Boyer, of Lille, on their improved spinning machines.
— Pape, on his improved pianos.
— Maitre, on his improved mills for grinding corn.
— Benoist, on his improved globes.
— Souchon, on his improved method of dyeing.
— De Beaujeu, on his sugar refining apparatus.
— Levavasseur Brothers, on their improved lamp.
— Boivin, on his improved batten.
— Mothes, on his machine for preparing flax.
— Jaillet, on his frame for making ornamented tissues.
— Sorel, on his method of regulating combustion.
— Galy Cazalat, on his gas microscope.
— Laurent, on his fastening for wardows.
— Reybaud Brothers, on their distilling apparatus.
— Plantevignes, on his machine called *railway marin.*
— Brewster, on his spinning machine.
— David, on his method of engraving cylindrical surfaces.
— Lehman, on his method of preparing straw.
— Breguet, Nephew, and Co., on their sympathetic clocks and watches.

# New Patents
## SEALED IN ENGLAND,
## 1834.

To Franz Anton Bernhardt, of Upper Montague-street, Montague-square, architect, for his invention of certain improvements in warming and airing buildings. —Sealed 4th December—2 months for inrolment.

To William Alfred Noble, of Cross-street, Cherry Garden-street, Bermondsey, in the county of Surrey, engineer, for his invention of certain improvements in applying the steam to the common and other engines. —Sealed 4th December—6 months for inrolment.

To James Hudson, of Gale, near Rochdale, in the county of Lancaster, calico-printer, for his invention of certain machinery and apparatus, applicable in block printing, on silk, woollen, cotton, and other fabrics, and on paper.—Sealed 4th December—6 months for inrolment.

To William Ranger, of Great Dean's-yard, in the county of Middlesex, builder, for his invention of certain improved modes of preparing and combining various materials, whereby the moulding or forming blocks, casts, walls, or other aggregates, in those said materials, may be considerably expedited, being improvements upon a patent granted to him for Ranger's artificial stone.—Sealed 4th December—6 months for inrolment.

To John West, of Crayford, in the county of Kent, blacksmith, for his invention of an improvement on forges.—Sealed 9th December—6 months for inrolment.

To Edward Massey, sen., of King-street, Clerkenwell, in the county of Middlesex, watch-maker, for his invention of certain improvements in the apparatus used for measuring the progress of vessels through the water, and for taking soundings at sea.—Sealed 9th December—6 months for inrolment.

To Richard Rettfort, of the Tavistock Hotel, in the parish of St. Paul, Covent-garden, in the county of Middlesex, gentleman, for a certain newly-invented machine or apparatus called a physiognotype, by means of which a perfect fac-simile of the human countenance can be immediately produced, or the exact copy of a bust or sculptured figure, or of a living or other subject taken, being a communication from a foreigner residing abroad.—Sealed 18th December—6 months for inrolment.

To Joseph Hansom, of Hinckley, in the county of Leicester, architect, for his invention of an improved vehicle, for the conveyance of various kinds of loads on common and other roads.—Sealed 23d December—6 months for inrolment.

To Joseph Ferguson, of Carlisle, manufacturer, for his invention of a certain combination of processes, whereby a new kind of dress or finish is given to certain goods.—Sealed 23d December—6 months for inrolment.

To Elijah Galloway, of Westmoreland-place, City-road, in the county of Middlesex, engineer, for his invention of certain improvements in steam-engines, which improvements are applicable to other purposes.—Sealed 23d December—6 months for inrolment.

To Henry Stothert, of the city of Bath, founder, for his invention of certain improvements in ships' hearths,

or cabouses.—Sealed 23d December—6 months for inrolment.

To John Smith, of Bradford, in the county of York, machine-maker, for his invention of a certain improvement on chisels or instruments for cutting or dressing stone, and certain other substances.—Sealed 23d December—2 months for inrolment.

To Robert Beart, of Godmanchester, in the county of Huntingdon, miller, for his invention of improvements in machinery or apparatus for making bricks.—Sealed 23d December—6 months for inrolment.

To William Crofts, of New Radford, in the county of Nottingham, machine-maker, for his invention of certain improvements in certain machinery for making figured or ornamented bobbin-net, or what is commonly called ornamented bobbin-net lace.—Sealed 23d December—6 months for inrolment.

To Richard Sinnister, of Manchester, ironmonger, for his invention of an improvement in the manufacture of such pens as are usually made of steel or other elastic metal.—Sealed 23d December—6 months for inrolment.

To Peter Fairbairn, of Leeds, in the county of York, mechanist, for his invention of an improved method of prepa, ringslivering or roving hemp, flax, and other fibrous substances for spinning.—Sealed 23d December—6 months for inrolment.

To John Browne, of Bridgewater, in the county of Somerset, merchant, for his invention of an improved instrument or apparatus for ascertaining levels.—Sealed 23d December—6 months for inrolment.

NEWTON AND BARRY.

*Patent Office,*
*Chancery Lane.*

## CELESTIAL PHENOMENA, FOR JANUARY, 1835.

| D. | H. | M | |
|---|---|---|---|
| 1 | | | Clock after the ⊙ 3 m. 42 s. |
| — | | | ☽ passes the mer. 2 h. 11 m. |
| 4 | | | ⊙ in Perigee. |
| 22 | 36 | | ☿ in conj. with β. in Sagitt., diff. of dec. 0. 6. S. |
| 2 | 2 | 9 | ♅ in conj. with the ☽ diff. of dec. 4. 18. N. |
| 3 | 21 | | ♂ in oppo. to the ⊙ |
| 10 | 8 | | ♃'s first sat. will em. |
| 5 | | | Clock after the ⊙ 5 m. 34 s. |
| — | | | ☽ passes the mer. 5 h. 57 m. |
| 6 | 3 | 33 | ☿ in conj. with λ in Sagitt., diff. of dec. 1. 12. N. |
| | 9 | 41 | ☽ in □ or first quarter. |
| | | | Mer. R. A. 18 h. 30 m. dec. 24. 22. S. |
| | | | Ven. R. A. 17 h. 26 m. dec. 17. 50. S. |
| | | | Mars R. A. 6 h. 41 m. dec. 27. 2. N. |
| | | | Vesta R. A. 3 h. 15 m. dec. 12. 26. N. |
| | | | Juno R. A. 21 h. 26 m. dec. 11. 50. S |
| | | | Pallas R. A 16 h dec. 2. 47. N. |
| | | | Ceres R. A. 16 h. 3 m. dec. 15. 47. S. |
| | | | Jup. R. A. 4 h. 1 m. dec. 19. 54. N. |
| | | | Sat. R. A. 13 h. 27 m. dec. 6. 31. S. |
| | | | Georg. R. A. 21 h. 48 m. dec. 14. 2. S. |
| | | | ☿ passes the mer. 23 h. 23 m. |
| | | | ♀ passes the mer. 22 h. 12 m. |
| | | | ♂ passes the mer. 11 h. 30 m. |
| | | | ♃ passes the mer. 8 h. 50 m. |
| | | | Occul. 38. Aries is Im. 12 h. 17 m. Em. 12 h. 57 m. |
| 9 | 12 | 3 | ♃'s first sat. will em. |
| 10 | | | Clock after the ⊙ 7 m. 43 s. |
| — | | | ☽ passes the mer. 8 h. 47 m. |
| | 31 | | ☿ in conj. with $\gamma^1$ in Sagitt. diff. of dec. 1. 25. S. |
| | 3 | 50 | ☿ in conj. with $\gamma^2$ in Sagitt. diff. of dec. 1. 29. S. |
| | 6 | 28 | ♃ in conj. with the ☽ diff. of dec. 0. 40. N. |
| | 11 | 3 | ☿ stationary. |
| 11 | 6 | 32 | ♃'s first sat. will em. |
| — | | | Occul. ε in Tauri, Im. 6 h. 9 m. |
| 12 | 23 | 13 | ♂ in conj. with ε in Geminor, diff. of dec. 1. 54. S. |
| 13 | 3 | 1 | ♂ in conj. with the ☽ diff. of dec. 2. 8. N. |
| | 4 | 37 | ♄ in quad. with the ⊙ |
| — | | | Occul. μ. in Gemi. Im. 15 h. 38 m. Em. 16 h. 38 m. |
| 14 | 9 | 16 | Ecliptic oppo. or ○ full moon. |
| | | | ☿ in Perihelion. |
| | | | Clock after the ⊙ 9 m. 37 s. |
| - | | | ☽ passes the mer. 13 h. 14 m. |
| | 52 | | ♃'s first sat. will em. |
| | 57 | | ☿ in conj. with h ² Sagitt. diff. of dec. 1. 31. N. |
| | 59 | | ♃'s first sat. will em. |
| | 28 | | ♃'s first sat. will em. |
| - | | | Occul. υ. in Virgini. Im. 1h. 30 m. Em. 13 h. 36 m. |
| | | | Clock after the ⊙ 11 m. 15 s. |
| - | | | ☽ passes the mer. 17 h. 28 m. |
| | 1 | | ♄ in conj. with the ☽ diff. of dec. 1. 47. S. |
| | 56 | | ☾ in □ or last quarter. |
| | | | ☾ in Perigee. |
| | | | Mer. R. A. 20 h. 22 m. dec. 21. 23. S. |
| - | | | Ven. R. A. 17 h. 39 m. dec. 17. 42. S. |
| - | | | Mars R. A. 6 h. 20 m. dec. 27. 16. N. |
| - | | | Vesta R. A. 3 h. 18 m. dec. 13. 19. N. |
| | | | Juno R. A. 21 h. 56 m. dec. 10. 11. S. |
| - | | | Pallas R. A. 16 h. 32 m. dec. 4. 5. N. |
| - | | | Ceres R. A. 16 h. 27 m. dec. 17. 2. S. |
| - | | | Jup. R. A. 3 h. 58. m. dec. 19 51. N. |
| - | | | Sat. R. A. 13 h. 29 m. dec. 6 37. S. |
| - | | | Georg. R. A. 21 h 51 m. dec. 13. 46. S. |
| - | | | ☿ passes the mer. 0 h. 10 m. |
| - | | | ♀ passes the mer. 21 h. 25 m. |
| - | | | ♂ passes the mer. 10 h. 5 m. |
| - | | | ♃ passes the mer. 7 h. 45 m. |
| | | | Clock after the ⊙ 12 m. 35 s. |
| - | | | ☽ passes the mer. 22 h. 1 m. |
| 6 | 35 | | ♀ in conj. with the ☽ |
| 13 | 15 | | ☿ in sup. conj. with the ⊙ |
| 16 | 53 | | ♀ at greatest brilliancy. |
| 9 | 29 | | ♃ stationary. |
| 9 | 11 | | Ecliptic conj. or ● newmoon. |
| 12 | 9 | | ☿ in conj. with the ☽ diff. of dec. 2. 8. N. |
| 14 | 31 | | ☿ in conj. with η in Capricor. diff. of dec. 57. N. |
| 17 | 7 | | ♀ greatest Hel. Lat. S. |
| 11 | 43 | | ♃'s second sat. will im. |
| 14 | 5 | | ♅ in conj. with the ☽ diff. of dec. 4. 16. N. |
| 14 | 6 | | ♃'s second sat. will em. |
| | | | Clock after the ⊙ 13 m. 34 s. |
| — | | | ☽ passes the mer. 1 h. 40 m. |
| 3 | 41 | | ☿ in conj. with ι in Capricor. diff. of dec. 41. S. |

J. LEWTHWAITE, Rotherhithe.

# METEOROLOGICAL JOURNAL,

## FOR NOVEMBER AND DECEMBER, 1834.

| 1834. | Thermo. | | Barometer. | | Rain in inches. | 1834. | Thermo. | | Barometer. | | Rain in inches. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hig. | Low. | High. | Low. | | | Hig. | Low. | High. | Low. | |
| Nov. | | | | | | Dec. | | | | | |
| 26 | 40 | 34 | 29,78 | 29,75 | | 11 | 41 | 26 | 30,50 | 30,42 | |
| 27 | 46 | 26 | 29,68 | 29,58 | | 12 | 47 | 29 | 30,49 | 30,41 | |
| 28 | 48 | 38 | 29,50 | 29,46 | ,15 | 13 | 45 | 36 | 30,33 | 30,29 | |
| 29 | 49 | 36 | 29,45 | 29,40 | | 14 | 43 | 36 | 30,49 | 30,33 | |
| 30 | 47 | 34 | 29,37 | 29,35 | | 15 | 47 | 32 | 30,51 | 30,45 | |
| Dec. | | | | | | 16 | 46 | 35 | 30,37 | 30,30 | ,025 |
| 1 | 50 | 38 | 29,24 | 29,16 | ,35 | 17 | 47 | 33 | 30,20 | 30,09 | |
| 2 | 52 | 40 | 29,68 | 29,45 | ,05 | 18 | 47 | 33 | 30,20 | 30,18 | |
| 3 | 51 | 39 | 30,09 | 29,96 | | 19 | 49 | 35 | 30,21 | 30,14 | |
| 4 | 51 | 40 | 30,16 | 30,14 | | 20 | 47 | 37 | 30,09 | 30,05 | |
| 5 | 45 | 29 | 30,07 | 30,03 | | 21 | 46 | 36 | 30,18 | 30,09 | |
| 6 | 50 | 30 | 30,02 | 30,00 | | 22 | 45 | 34 | 30,32 | 30,27 | |
| 7 | 57 | 41 | 30,07 | 30,06 | | 23 | 43 | 30 | 30,34 | 30,29 | |
| 8 | 47 | 39 | 30,13 | 30,06 | ,225 | 24 | 39 | 22 | 30,29 | 30,26 | |
| 9 | 45 | 31 | 30,42 | 30,36 | | 25 | 43 | 29 | 30,34 | 30,32 | |
| 10 | 47 | 29 | 30,30 | 30,15 | ,2 | | | | | | |

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich

THE

# London

## JOURNAL OF ARTS AND SCIENCES

AND

## REPERTORY

OF

## PATENT INVENTIONS.

*CONJOINED SERIES.*

No. XXXIV.

## Recent Patents.

*To* WILLIAM HENSON, *of the city of Worcester, lace-manufacturer, for his invention of certain improvements in machinery for manufacturing lace, commonly called bobbin-net lace.*—[Sealed 14th March, 1833.]

THE subject of this invention applies, in the first instance, to that particular construction of machinery for making lace, called the circular bolt or circular comb machine, in which the carriages of the bobbins are driven by the reciprocating action of fluted rollers, but with varying speeds, in different parts of their vibratory course, for the purpose of enabling one tier of carriages to overtake the other tier; the improvement causing the vibratory arcs of the bobbins and carriages to be less than in the usual construction of fluted roller

machines. This arrangement also allows the bobbins and carriages of an ordinary driver and locker machine, either upon the circular bolt or circular comb principle, to be actuated by fluted bars or rollers, and consequently the bobbins and carriages to work with greater speed.

A second feature of the improvement is, for the purpose of enabling narrow stripes of lace with selvages to be made in fluted roller machines, by the employment of any required number of toothed rims or wheels, mounted upon and coincident with the surface of the fluted rollers. These wheels are intended, at certain times, to be confined, for the purpose of allowing the roller, as an axle, to revolve within them, in order to traverse the carriages at the selvages of each breadth.

Thirdly, in a mode of whipping or lacing the selvages of the breadths of lace together, by a series of bobbins and carriages moving upon circular bolts or combs placed below, which bobbins and carriages conduct the whipping threads round insulated guides of the warp threads.

The fluted bar or fluted roller machine was first introduced by the present Patentee, who, in conjunction with William Jackson, of Worcester, obtained a patent for the invention, dated 11th January, 1825.—(See London Journal of Arts, vol. xii., First Series, page 141.) These fluted roller or fluted bar drivers have generally been applied to machines in which the bobbin carriages traverse to and fro on circular bolts; they are of the class called double-tier machines, that is, in which the bobbins and carriages are passed through the warp threads in two rows or tiers, one row or tier following the other; and the bobbin threads of such tier being made to traverse across the piece of net

diagonally in opposite directions; and, as the threads thus cross each other, they form the tops and bottoms of the hexagonal meshes of the net.

In Plate XVI., fig. 1, represents a transverse section of the principal working parts of a lace machine, on the circular comb principle, driven by fluted bars or fluted rollers. The carriages of the bobbins *a*, *b*, move on circular combs, *c*, *c*, and are passed between the warp threads *d*, alternately, from back to front, and front to back, by means of two pairs of fluted bars or rollers *e*, *f*, and *e*, *f*; the projections, or flutes, being formed like the teeth of pinions. These fluted rollers are placed beneath the circular combs in such situations, that their teeth or projections may take into the notches, formed on the under side of each carriage, below the combs.

The fluted rollers turn in bearings in the end frames of the machine, and are made to revolve alternately in opposite directions, by means of an oscillating sector rack *g*, suspended from a pivot at *h*, in the end frame; which rack takes into the teeth of pinions fixed on the ends of the fluted rollers.

The oscillating movement of the sector rack may be produced by a revolving crank, or levers, or by any other known means, and being in gear with the pinions on the ends of the fluted rollers, will, as it swings, cause all the rollers to revolve simultaneously, and thereby drive the bobbin carriages to and fro in the combs, one tier, as *a*, after the other *b*, for the purpose of passing them between the warp threads, from the set of combs on one side to the set of combs on the other side, and back again.

The racking or lateral shifting of the warp threads *d*, is performed by the shogging of the guides *i*, *i*, when

one tier of bobbin carriages *a*, are in the front set of combs, and the other tier *b*, in the back set, so that when the following tier of carriages *b*, pass between the threads, they effect the crossing or twisting of the threads together; but as the fluted roller machines, and the manner in which they work, is well known to lace-makers, it is unnecessary to enter into a more particular description of their construction, or mode of operating.

In the fluted roller machines, as they are commonly constructed and worked, the two tiers or rows of bobbin carriages *a* and *b*, are kept at a proper distance apart, in order to leave a sufficient space between them to allow of the racking or lateral shifting of the warp threads, which, as above stated, takes place immediately after one tier of bobbins has passed through the warp in their backward or forward movement, and before the other tier has followed; and as the rollers move simultaneously in the ordinary machine, the same distance must be preserved between the two tiers of bobbin carriages, whatever be their position.

The object of the first feature of the present improvement, is to cause each tier or row of bobbins and carriages, after passing through the warp threads, to slacken its progress, and to move no further in the combs than is necessary, the second tier following with a continuous progress until it has overtaken the first; by which means there is no space left between the two tiers when they are both in the same set of combs, there being no occasion for such space after the racking of the warp threads has taken place.

The same object is also in view in adopting the fluted rollers or bars to that description of machines called the circular bolt principle (see fig. 2), in order that the

bobbin carriages may be worked on the circular bolts, by means of the said fluted rollers, instead of the drivers and fetchers, commonly used in this description of machinery.

As the improved contrivance applies exactly in the same way to both the above constructions, its principles will be seen by reference to figs. 3 and 4. The object being to give varying speeds to the bobbin carriages from one uniform rotary power, pinions are applied to the ends only of the two inner fluted rollers, as shown at figs. 3 and 4; and these communicate their rotary movements by crank arms, links, or levers, connected by joints to the pinions' arms, as fig. 3; or so fixed to the ends of the outer fluted rollers, as fig 4, instead of driving them immediately by the sector rack as heretofore. By these means, it will be obvious that though the inner rollers are turned to and fro with a uniform rotary movement, yet the outer rollers, being driven by the cranks, will move with different speeds, that is, faster or slower, according to the positions of their connecting links or cranks, and thus move the outer tier of carriages faster or slower than the inner tier.

The second feature of the improvement, viz. that of making breadths or narrow strips of lace on fluted roller machines, is effected by the employment of toothed rims or wheels, which are made to correspond with the indentions of the inner fluted rollers, and are mounted thereon loosely so as to turn upon them as their axles.

These toothed rims or wheels are mounted upon the fluted rollers in any number, and distance apart, according to the different breadths or strips of lace intended to be made in the machine; and are placed in such situations, that they stand immediately under those

gates or places of the combs where the bobbins and carriages, as they successively arrive, are intended to produce the selvages: these several toothed rims or wheels, being for the purpose of traversing the selvage carriages in the same manner and with the same effect as the small toothed rims or wheels, which are placed at the end of the inner rollers in the common fluted bar or fluted roller machines, constructed to make bobbin-net in broad pieces.

At those parts of the fluted rollers where the fluted rims or wheels are to be introduced, the roller is turned away, and a narrow circular groove formed, sufficient to receive the toothed rim or wheel.

Fig. 5, represents a portion of one of the fluted rollers, showing the grooves into which the toothed rims are to be inserted. Fig. 6, represents one of the toothed rims detached; and, fig. 7, the same, opened at its joint, in order to be clipped on to the roller. Fig. 8, is a cross section of the roller, with one of the wheels attached; and it will be perceived that, being pressed to the cylindrical part of the roller by very slight springs, the wheels are allowed to turn upon their axles, or to be held stationary while the roller revolves. This holding of the wheels may be effected in various ways, either by tappets or stops affixed to auxiliary bars, which may be raised for the purpose of locking or confining these wheels at certain periods of the evolutions of the machine.

A mode of effecting this is shown at fig. 9, which represents a section through the machine: *a*, and *b*, are the two tiers of bobbins and carriages moved to and fro upon the circular bolts or combs *c*, *c*, by means of the fluted rollers *e*, *e*, and *f*, *f*, as before described; *x*, is the selvage bobbin, which is held fast and prevented

from passing onward with the carriage *a*, by means of the stop-piece *y*. This stop-piece is by a movement of the bar *x*, brought into the situation shown in the figure, for the purpose of preventing the bobbin and carriage *z*, from acting with the other bobbins and carriages *a*, and *b*; and the toothed rim or wheel *w*, attached to the fluted roller in the way described, is at this time held fast also by the stationary carriage, although the fluted roller continues revolving, for the purpose of driving the other bobbins and carriages by the means already explained. The opposite stop-pieces *v*, and their bar *u*, are at this time lowered out of the way of the carriages; but when the carriages *z*, are required to be stopped in the combs or bolts at that side of the machine, they are raised in a similar way. The effect of these stationary carriages is so well known to lace-makers, that it is unnecessary farther to describe them, or the mode of operating in forming the edges or selvages of the net.

The third part of the improvement has for its object the whipping or lacing of the selvages of narrow breadths of lace together, by passing extra bobbins and carriages, carrying the whipping thread round guides of the selvage warp threads; which guides are separate from the guides of the ordinary warp threads, but range with them in rows throughout the machine. The intention of this part of the improvement may be better understood by reference to the specification of a patent granted to the present Patentee, dated 26th December, 1832. (See vol. iv., Conjoined Series, page 105.)

In that specification, a double-headed guide is described for conducting the two selvage threads from the warp roller, with a revolving single guide passing round it to carry the whipping threads for connecting or lacing

the breadths together. In the present improvement extrabobbins and carriages are employed, which move in the circular combs or bolts, and around the selvage warp guides, instead of the revolving guides of the whipping threads. These extra bobbins and carriages having precisely the same effect as the contrivance proposed under the former patent.

Fig. 10, represents a partial section of a machine on the circular bolt principle, but driven by pushers and ocker bars, the working parts only being shown, and those which form the present improvement being alone referred to by letters of reference. One of the several selvage warp guides is shown at *a*; it is a single blade upon a stem fixed into the rail *b*. The stem is hollow, to allow two warp threads to pass from the warp beam over a guide roller; and which threads proceed one on each side of the blade, and through the guide holes at top, in opposite directions. The bobbins and carriages with the whipping threads stand in a range as *c*, the upper part of the carriage being elongated, and forming a guide *d*, for conducting the whipping threads.

These bobbins and carriages are moved in the extra circular combs or bolts *e*, by means of the small pinions *f*, *f*, which may be mounted upon a long shaft, and be made to revolve by a toothed sector or rack, or by any other means: the warp guides *a*, stand upward through an opening made in the auxiliary combs, which openings are sufficiently wide to afford room for the guides when the bar *b*, is shogged. This shogging is to allow the whipping bobbin *c*, *d*, to pass first on one side of the guides *a*, and then on the other side; by which means the whipping threads are twisted round the selvage warp threads, and thereby connect or whip the selvages together.

The Patentee concludes by saying—"Having now described the character of my said improvements, and the manner in which the same are to be performed, I wish it to be understood, that I do not mean or intend to claim as of my invention, any of the parts which are old, or have been before used for the same purpose; but I do claim as of my invention, first, the application to fluted bar or fluted roller machinery of the cranks and connecting link for working the outer fluted rollers or fluted bars, or fetchers and lockers, in the manner above described. Secondly, making narrow breadths of lace in fluted roller or fluted bar machinery, by the agency and application of the toothed rims or wheels, for the purpose of effecting the traverse of the selvage bobbins and carriages, without confining myself to any particular mode of stopping the bobbins and carriages, which occasionally form the selvage bobbins and carriages. But I do not claim as of my invention, the application of those toothed rims or wheels to such fluted bar or fluted roller machine, as make only one breadth of lace in the whole width of the machine. And, lastly, I claim as my invention, the mode of whipping or lacing together the selvages of the breadths of lace, by means of the extra bobbins and carriages moving upon circular bolts or combs, and carrying the whipping threads round insulated guides of the two selvage warp threads, or round the selvage bobbin threads and warp threads, together or separate."—[*Inrolled in the Rolls Chapel Office, September*, 1833.]

Specification drawn by Messrs. Newton and Berry.

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*To* JOHN CHRISTOPHER, *of New Broad-street, in the city of London, merchant, for his invention of an improvement in clothes buttons.*—[Sealed 7th October, 1831.]

THE improvement herein proposed consists in making the buttons for clothes each in two parts, that is, one part constituting the disc of the face of the button, and the other part, a smaller disc for the shank or hinder part; the latter of which is to be connected to the face part, if we understand right, after the button has been put upon the clothes.

There are four modes of constructing these buttons described in the specification, which are shown in Plate XVII.

Fig. 1, represents the first plan: *a*, is the disc or face part of the button, made of metal or other suitable material; to which is affixed, by soldering, or other means, a cylindrical stem *b*, having a pin *c*, extending from its end. Another disc *d*, shown detached, has several holes, by which it may be screwed to the garment, to prevent its turning round; and when that is done, the stem *b*, is to be passed through an eylet-hole in the garment, and the pin *c*, inserted into the central hole of the disc *d*, and riveted at the back part. This connects the face-part of the button with the smaller disc, and forms the shank by which it is held fast.

Fig. 2, is a variation from the above, the stem *b*, having a recess within it, into which a conical pin *c*, extending from the smaller disc *d*, is intended to be introduced after the shank *b*, has been passed through the garment; when the two parts, being pressed to-

gether by the blows of a hammer, or other force, they will become firmly united and attached to the garment.

Another construction is shown at fig. 3, in which the stem *b*, is made part of the stud *d*, and has a pin *c*, extending from it, which is to be passed through a hole in the centre of the face-piece *a*, and to be riveted in front. It is stated that, in order to prevent the rivet-head being seen on the face of the button, the central part of the face may be engraved or engine-turned, or otherwise ornamented, so as to hide the rivet. How this is to be done, after the button is attached to the garment, the Patentee has forgotten to tell us.

The fourth plan is represented at fig. 4, in which the pin *c*, is made fast to the hinder part of the face-disc *a*, and is intended to be inserted into the socket or hollow stem *b*, of the stud *d*, and to be secured by soldering. This operation appears to be like the former, subject to some difficulty, and at all events renders it necessary that a competent tailor should be an expert tinker also.

The drawing appended to this specification, beside the above, contains two figures, representing a bodkin, by which the holes are to be made for inserting the stems of the buttons into the garment: perhaps our readers may be aware of the form of such an instrument, and will excuse our describing it particularly, although the Patentee, or, we presume, his professional adviser, has thought it necessary to occupy several closely-written skins of parchment with the details of this invention.—[*Inrolled in the Inrolment Office, April*, 1832.]

*To* JOHN CHRISTOPHER, *of New Broad-street, in the city of London, merchant, for his invention of an improvement or improvements in cloth buttons.*—[Sealed 4th August, 1832.]

THIS is an improvement upon the preceding patent, and consists in forming the shanks of the buttons in a different manner to the foregoing.

Plate XVII., fig. 5, represents an edge view of the disc of a button *a*, there being a hollow stem *b*, soldered, or otherwise made fast to the back part of the disc. This stem is cut or slit about half-way down, as shown in the figure; and the slips or pieces of the tube are then bent back into the star-form, represented at fig. 6. This star is intended to be the substitute for a shank, by which the button is held fast to the garment.

Another mode of forming the button is shown at figs. 7, and 8, in which the smaller disc, intended to constitute the shank, is connected to the stem of the larger disc by a spring catch.

Fig. 7, is an edge view of the disc, forming the face-part of the button *a*, at the back of which a hollow cylindrical stem *b*, is soldered. Fig. 8, is an edge view of the smaller disc *d*, intended to form the shank. This disc is made of two parts, as shown at fig. 9, a back view of the button; and these are connected by being soldered to the spring catch *c*.

When the stem *b*, of the button, fig. 7, has been passed through the eylet-hole of the garment, then the spring *c*, of the shank, fig. 8, is pressed into the hollow stem, and it is there held fast by notches catching against the edge of the cylindrical stem, exactly in the same way as the catches or snaps of necklaces are commonly made.—[*Inrolled in the Inrolment Office, February*, 1833.]

*To* PHILIP CHILWELL DE LA GARDE, *of the city of Exeter, Gent., for his invention of certain improvements in apparatus for fidding and unfidding masts, and in masting and rigging of vessels.*—[Sealed 27th February, 1830.]

A FID is usually a bar passed through a large mortice-hole in the lower part of a topmast, the ends of the bar which extend on each side resting upon the top cross-trees, and thereby supporting the topmast in its elevated situation.

When from stress of weather or other causes it may be requisite to lower the topmast, it is necessary, in the first instance, to lift the mast up from its seat, in order that the supporting bar or fid may be withdrawn from the fid-hole.

The act of striking the topmast in tempestuous weather, when the mast is held up by the ordinary fid, is always attended with very considerable difficulty, delay, and danger; and in order to facilitate the operation of withdrawing the fid from the fid-hole, several kinds of fids have been invented and secured under letters patent, one of which forms the subject now before us.

This improved mode of fidding and unfidding a topmast consists in introducing into the fid-hole, in place of the bar commonly employed, a pair of wedges, which, owing to the inclination of their surfaces, may be more readily withdrawn from the fid-hole than the straight horizontal bar.

Plate XVI., fig. 11, represents in vertical section a portion of the lower part of a topmast *a*, *a*, above the cross-trees and tressel-trees *b*, *b*, which topmast is held up by a pair of wedges *c*, and *d*, placed together, and introduced transversely through the fid-hole.

The mast having been sufficiently elevated by means of tackle, the lower wedge *c*, is first introduced and made to rest upon the rollers *e*, *e*, supported in bearings on the tressel-trees. The upper wedge *d*, is then placed upon the lower, their inclined planes facing each other. They are then confined by two block pieces called chocks, *f*, *f*, placed at their ends, which chocks are held in those situations by horizontal catch-leavers; and the mast being now lowered, so as to bear upon the upper surface of the wedge *d*, it is braced down in that situation, and said to be fidded.

The manner in which the catch-leavers that hold the blocks are mounted is not very clearly shown, nor is the mode of working them. Tackle is to be applied through the agency of an endless chain to the outer extremities of the catch-leavers in a way, as we conceive, that is extremely complicated; and by means of this tackle worked by the seamen, the catches or hold fasts are to be withdrawn from the blocks, when the blocks may be removed, and the wedges *c*, and *d*, be drawn asunder, by which means the mast, losing its support, may be lowered, and the bracing tackle thereby becoming loosened, the mast can, without difficulty, be struck, and the top rigging readily removed.

In order to facilitate the removal of the fidding wedges *c*, and *d*, by reducing the friction, the lower wedge is supported by rollers *e*, *e*, and the under part of the fid-hole bearing upon the upper wedge has rollers also, by which the wedges are enabled to slide readily when the confining blocks are removed; or rollers may be introduced into the wedges themselves, a small portion of their surfaces only standing out beyond the face of the wedge.

The mounting of the auxiliary parts may be varied;

but the essential feature of the invention is the two bars with inclined surfaces or wedges *c*, and *d*, applied for the fidding of a topmast.

In reference to that part of the invention which proposes to improve the masting and rigging of vessels, we can by no means comprehend what the Patentee intends. He says, in the introduction to this second part of his very long and obscure specification, by way of summing up the principal objects, "that in reeving the tack, a rope or chain is attached to the lower corner of a sail, to bring itinward, and proceeded through a block, which can be traversed to and fro obliquely to the keel, and fixed in different places, more or less in board, obliquely to the keel." We doubt whether any further recital of the specification would throw more light upon this part of the subject.—[*Inrolled in the Inrolment Office, August*, 1830.]

*To* FRANCIS STILES BLAKE, *of his Majesty's dock-yard, Portsmouth, shipwright, for his invention of an improvement in fids for the upper masts, running bowsprits, and gib-booms of ships and other vessels.*—[Sealed 14th August, 1833.]

THIS invention has the same object as the preceding, viz., to facilitate the unfidding of masts; but in this instance the bar passed through the fid-hole of the mast is a lever turning upon a fulcrum pin near its centre, the ends of which lever, when in a horizontal position, project outside, and bear upon the cross-trees or tressel-trees.

Plate XVI., fig. 12, represents a portion of the topmast

of a vessel shown in vertical section, supported by the improved fid. Fig. 13, is a horizontal section of the same; *a*, *a*, is the topmast; *b*, *b*, the cross-trees; and *c*, *c*, the transverse supporting bar or lever fid, which is capable of turning vertically upon its axle or fulcrum pin in the fid-hole or recess *d*, *d*, cut through the lower part of the mast.

When the lever fid *c*, *c*, stands horizontally, as shown, one of its ends bears upon a wedge-piece or block *e*, fixed to the cross-trees, and the other end upon a wedge-shaped lever *f*, which turns horizontally upon a pin set upright in the cross-trees. This wedge-shaped lever is best seen in the horizontal section, fig. 13; it is there shown as confined in its holding position by a latch or catch *g*, which is the position when the mast is fidded.

On removing the catch *g*, from its holding position, the wedge-lever *f*, may be drawn from under the end of the fid, as shown by the dotted lines in the horizontal section, fig. 13, when the fid will immediately fall into the inclined position shown by dots in the vertical section fig. 12; and the mast, by thus losing its support, will be able to descend without impediment, by the ends of the lower fid retiring within the recess or fid-hole *d*, *d*, cut through the lower part of the mast, and thus the mast becomes unfidded.

For the fids of larger vessels, it may be necessary to exert considerable force in withdrawing the horizontal wedge-lever *f*, from under the end of the fid; in that case, the Patentee proposes to attach a power lever to the cross-tree, which shall be enabled to act upon the end of the wedge-lever, for the purpose of drawing it out.

A similar contrivance may be adapted to a running bowsprit, as shown in the horizontal section, fig. 14.

This bowsprit, the Patentee says, may either be fitted with a separate fid in each reef-mortice, or may have a moveable fid applicable to all.

The claim of invention consists in "having the fid attached to the spar with which it is to be used or held within the fid-hole, and turning or balancing on a centre or pivot, and resting at one end on a moveable bearing plate, lying over a groove cut in the tressel-tree in such manner, that by taking away the support from and lowering one end of the fid, both ends are brought completely within the fid-hole, and no impediment offered to the raising, lowering, or sliding in or out, as the case may be, as is hereinbefore described."—[*Inrolled in the Inrolment Office, February*, 1834.]

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*To* JOSEPH CHESSBOROUGH DYER, *of Manchester, in the county-palatine of Lancaster, patent card manufacturer, in consequence of improvements by himself, and communications made to him by a certain foreigner residing abroad, for certain improvements on and additions to machines or machinery to be used and applied for conducting to and winding upon spools, bobbins, or barrels, rovings of cotton, flax, wool, or other fibrous substances of the like nature.*—[Sealed 27th February, 1830.]

THE subjects of this patent are to be considered as improvements upon a former patent, for "conducting to and winding upon spools or bobbins, rovings of cotton, &c.," granted to Mr. J. C. Dyer, 16th July, 1825: for a description of which, see vol. xiv., First Series, of the "London Journal of Arts," p. 6.

The feature of improvement then proposed, was a hollow spindle placed horizontally, through which the roving of yarn was conducted from the front pair of drawing rollers to the lapping roller upon which the yarn was wound in a compact state, being pressed tightly upon the roller by the surface of a conducting arm, extending from the carriage of the spindle; and the hollow spindle being made to revolve, gave a temporary twist to the roving as it passed through, but which became untwisted in the operation of lapping or winding on to the spool or bobbin.

The improved machine, forming the subject of the patent now before us, retains the same feature,—the adaptation of horizontal hollow rotary spindles, through which the rovings pass from the drawing rollers to the winding bobbins, by which the fibres of the cotton are first twisted and then untwisted; but the particular arrangements of mechanism by which they are made to operate, constitutes the present novelty.

These arrangements are exhibited in nine elaborate sheets of drawing, which our limits will not allow us to give, nor do we consider it at all necessary, as there does not appear to be any novel movements exhibited in the drawings, nor is there any thing claimed beyond mere arrangement.

One of the sheets of the drawings exhibits an ordinary bobbin and fly-frame, in which a small spring lever is shown, extending from one of the arms of each of the flyers; which lever conducts the roving from the arm of the flyer into the barrel of the bobbin, and by the force of the spring pressing against the surface of the roving upon the bobbin, causes the rovings to be wound on in a compact state. This is the improvement in the bobbin and fly-frame, which is applied

under license by Messrs. Cocker and Higgins, of Salford; and by which construction the filaments of roving obtain a small quantity of twist, as well as consistency or hardness in the winding.

The claims of novelty are pointed out under four heads: first, the form and plan of arranging the conducting tubes (hollow spindles), whereby they are made to act in pairs, or three together, for the purpose of carrying three rovings in a converging form to the bobbin to be wound on together; second, the apparatus for giving the traverse motion, so that the rovings may be wound on bobbins without flanges, and formed into hard cylindrical rolls with conical ends; third, the arrangement by which a series of parallel conducting spindles are made to wind the rovings into a corresponding series of small bobbins mounted upon a long shaft; and, fourth, an arrangement by which a similar series of parallel conducting spindles are made to wind the rovings close together, on to a long cylindrical roller or bobbin mounted upon a longitudinal shaft, extending through the engine.—[*Inrolled in the Inrolment Office, August*, 1830.]

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*To* GEORGE CARTER, *of Mottingden Lodge, in the county of Kent, Gent., for certain improvements in paddle-wheels.*—[Sealed 1st June, 1833.]

THE improved paddle-wheel, described as the subject of this patent, is formed by two series of paddles placed obliquely to each other, with a valve or flap closing the space between them: the object of which is, that the

paddles, in making their stroke through the water, may, by the recess they form, take better hold of the water than they are enabled to do in the ordinary construction of paddle-wheels; and that, after having passed through the effective part of their stroke, the valve in the middle may open to allow a free passage of the water, and thereby relieve the resistance which would otherwise be operating, by partially lifting the water as the paddles rise.

Plate XVII., fig. 10, is a vertical section, taken transversely through the improved paddle-wheel—that is, in the direction of its axis, showing only a pair of the oblique paddles *a*, *a*, at top, and a similar pair at bottom, with the valve *b*, between them, open above and closed below. Fig. 11, is a diagram, showing the position of the paddles and the valve, as attached to the arms or frames of the wheel when in the water.

By the oblique positions in which the paddles on the two sides of the wheel stand towards each other, as shown in fig. 11, with the closed valve between them, it will be perceived that a recess is formed, which will partially prevent the water from escaping at the edges, and thereby enable the paddles to obtain a more effective stroke in the water than if they were placed straight.

It will, of course, be understood, that many pairs of these paddles are attached round the wheel, and made fast to the arms or frames, and that the whole revolves upon an axle *c*, driven by a steam-engine within the vessel, as usual.

The valves *b*, are mounted upon radial spindles *d*, which respectively stand between the inner edges of each pair of fixed paddles, and they are enabled to turn for the purpose of shifting the position of the

valve. To the side of each spindle a rod *e*, is connected by a joint and crank-arm, and the reverse end of each rod *e*, is inserted into an oblique groove, formed round a stationary plate or box *f*. The rods *e*, are enabled to slide through apertures in the arms of the wheel, and as the wheel goes round the oblique groove of the box *f*, causes the rods *e*, to be slidden to and fro, so as to turn the spindles a quarter round by means of their crank-arms, and thereby to close the valves successively as they come into the lower or propelling position, and to open or turn them edgeways as they rise out of the water.

By these means a greatly extended surface of paddle is obtained, and a more effective resistance afforded in the propelling stroke; and when that stroke has passed the point of effective operation, the valve turning round, opens a way for the free passage of the water, in order to relieve the rising of the paddle.

The Patentee says that his claim of invention consists in "adding certain valves to the float-boards of paddle-wheels, whereby the water against which such float-boards are acting is permitted to flow through as soon, as the float-boards would be no longer acting advantageously in propelling the vessel, and at the same time the water will not be lifted by the float-boards as they leave the water, and thus the surge caused by the back water will be in a great measure avoided. I would observe, that although I have here described the valves as turning on axes, yet it will be evident, that in place thereof the same may be caused to slide up and down; nor do I confine myself to the precise arrangement of parts for turning the valves.

"I would also have it understood, that I am aware that paddle-wheels have been before made with angular

float-boards, I do not, therefore, lay any claim thereto; but do hereby wish it to be understood, that I confine my claim of invention to the placing of valves *b*, to stop the water from flowing between such angular flat-boards during the time they are advantageously acting on the water to propel the vessel, and opening a way for the passage of the water between them as soon as their action would not be longer advantageous, and thus tending to prevent the lifting of the water as above described."—[*Inrolled in the Inrolment Office, December* 1833.]

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*To* WILLIAM MASON, *of Margaret-street, Cavendish-square, in the county of Middlesex, axle-tree-maker, for his having found out or invented certain improvements on axle-trees, and also on boxes applicable thereto.*—[Sealed 24th August, 1830.]

THESE improvements apply particularly to the boxes and axles of that construction of carriage-wheels which are fitted with what are commonly called mail boxes; part of the invention applies also to other axles.

Plate XVII., fig. 12, represents the nave of a wheel, with the box for the axle within it, both shown in section longitudinally; fig. 13, is a section of the axle taken in the same direction; and fig. 14, represents the screw-cap and oil-box which attaches to the outer extremity of the axle-box. Supposing the parts were put together, that is, the axle inserted into the box, as fig. 15, which is the case when the wheel is secured upon the axle, then the intention of the different parts will be perceived.

The cylindrical recess *a*, in the box of the nave, is designed to fit the cylindrical part of the axle *b*; and the conical part *c*, of the axle, to shoulder up against a corresponding conical cavity in the box, with a washer of leather to prevent its shaking. A collar *d*, formed by a metallic ring, fits loosely upon a cylindrical part of the axle, and is kept there by a flange or rim *e*, fixed behind the cone *c*. Several strong pins *f*, *f*, are cast into the back part of the box, which pins, when the wheel is attached, pass through corresponding holes in the collar *d*, and nuts being screwed on to the end of the pins *f*, behind the collar, keeps the wheel securely attached to the axle.

The screw-cap *g*, is then inserted into the recess *h*, at the outer part of the box, its conical end and small tube *i*, passing into the recess *k*, in the end of the axle.

The parts being thus connected, the oil contained within the cap *g*, will flow through the small tube *i*, in its end into the recess, or cylindrical channel *l*, within the axle, and will thence pass through a small hole in the side of the axle into the cylindrical recess *d*, of the box, and then lodging in the groove and other cavities within the box, will lubricate the axle as the wheel goes round. There is also a small groove cut on the outside of the axle for conducting the oil, in order that it may be more equally distributed over the surface and the bearings.

This construction of the box and axle, as far as the lubrication goes, may be applied to the axles of wheels in general; but that part of the invention which is designed to give greater security in the attachment of the wheel to the carriage, applies particularly to mail axles.

The claim of invention consists in the peculiar construction and arrangement of the parts of the box and

axle for lubricating, and thereby reducing the friction as the wheel revolves; and the peculiar construction of the pins cast into the lugs of the box for attaching and holding the wheel with greater security than is effected by the ordinary mode of attachment employed to mail axles.—[*Inrolled in the Petty Bag Office, Feb.* 1831.]

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*To* JOHN REVERE, *late of New York, in the United States of North America, but now of Weybridge, in the county of Surrey, Doctor of Medicine, for his invention of a new and improved method of protecting iron chain cables, and iron boilers, and iron tanks, from the corrosion produced upon them by the action of water.*

[Sealed 27th November, 1830.]

FROM the time that Sir Humphrey Davy made known to the world his discoveries of the capability of preventing galvanic action on the surface of the copper sheathing of ships immersed in salt water, by connecting zinc in certain proportions to the metal, several attempts have been made by others to prevent the oxydation of iron when exposed to damp by similar means.

Mr. G. S. Paterson proposed to attach zinc plates of certain proportionate dimensions to the iron sheathing of ships, with zinc collars under the heads of the nails or bolts, and washers of zinc round the spikes, and round the braces and pintals of rudders. (See the Second Series of the "London Journal of Arts," vol. iii. p. 247.) Doctor Bompas proposed to employ pieces of an alloy as protectors to metals generally, for the purpose of preventing their oxydation. (See vol. i. of our

Christopher & Imp.t Buttons

Fig 1 Fig 2 Fig 3 Fig 4 Fig 5 Fig 6 Fig 7 Fig 8 Fig 9

Fig 12

Mason & Imp.t Stirrups

Fig 13

Fig 15

Imp.t Double Wheel

Fig 14

Fig 10

Fig 11

Steam Boiler

Fig 16

Improved Steam Boiler

Fig 17

Portable Optical Instrument

Fig 20

Fig 21

Fig 19

W Newton Del.t

Feb.y 1835.

T. Yates Sculp.

Conjoined Series, p. 418, and the present volume, p. 177.) The patentee, Doctor Revere, proposed for the sheathing of ships, and various other uses, an alloy of copper and zinc (see p. 119 of the present volume); and Mr. M. Uzielli adopted an alloy of copper and tin, prepared in plates for sheathing. (See vol. vii., Second Series.)

After all these variations of the first principle, it is rather singular that, as in the present instance, a patent should be obtained merely for attaching pieces of zinc to ship's cables, and boilers, and tanks, for the purpose of preventing corrosion.

These plates of zinc are to be connected to any of the abovenamed iron articles by means of small pins, screws, or otherwise; and the area of their services are to bear something like a proportion of five per cent. to the area of the surface of the article intended to be protected.—[*Inrolled in the Petty Bag Office, January*, 1831.]

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*To* JAMES FRASER, *of Bevis Marks, St. Mary Axe, in the city of London, engineer, for his invention of certain improvements in steam-boilers, and in the arrangement of the machinery attached thereto, as applicable to land carriages.*—[Sealed 8th May, 1833.]

THIS is a steam-boiler intended principally for locomotive purposes: it is elliptical in its external form, having the furnace in the middle, and the flues leading therefrom are carried round through the water in a convolute curve.

Plate XVII., fig. 16, represents the boiler in section, taken through the middle transversely in a vertical

direction: *a*, is the furnace; *b*, *b*, *b*, the outer plates, which determine the elliptical form of the boiler; *c*, *c*, *c*, are the flues passing round from the furnace in a convolute curve, and discharging the smoke at top; *d*, is the ash-pit; and *e*, the man-hole, for obtaining access to the interior of the boiler.

It will be perceived that the water flows completely round the flues; which flues may be made to extend longitudinal from end to end of the boiler, or be divided into two or more compartments by vertical partitions, having water-ways between; and occasional transverse passages may be made horizontally through the flue, for the purpose of assisting the circulation of the water through every part of the boiler. The steam generated rises of course to the top part *f*, which constitutes the steam chamber, and from thence it passes off to the engine. The transverse passages *g*, of which there may be several, are intended to support the fire bars of the furnace; which bars are to be placed longitudinally, their ends bearing on the tubes.

The fuel is intended to be introduced from a hopper, by a tube or pipe opening from the outside of the boiler, and descending in an inclined direction inward toward the furnace. A door may be made in the end of the boiler opposite the furnace-mouth for stoking the fire, and the cinders may be withdrawn from the ash-pit by another door in the end. Access may also be obtained to the flues, in order to clear away the soot by openings at the end.

The precise construction of the improved boiler having been shown, as in the specification, we are at a loss to understand what the Patentee means by variations; as he distinctly states in conclusion, that he claims the above-described arrangement of flues.

With reference to the second clause of the title, "the arrangement of the machinery attached thereto (to the boiler), as applicable to land carriages," we are utterly at a loss to understand the Patentee's intentions, as no sort of machinery is shown in the drawings; and the only explanation given is in the following words:—

"The arrangement of the machinery, as attached to the above-described boiler, is a bent or curved axle-tree, for the purpose of giving to the boiler greater security, and bringing it nearer to the ground, but in no other respect do I claim the axle-tree."

There is no axle-tree shown, nor any mode by which an axle-tree might be attached to the boiler; nor does it appear for what purpose it should be attached: neither can we understand how a bent axle-tree, if it were applied merely to support the boiler in its carriage, could be considered as an arrangement of machinery; but as to any further information on this point, the specification is silent.—[*Inrolled in the Inrolment Office, July,* 1833.]

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*To* Sir CHARLES WEBB DANCE, *of Hertsbourne Manor-place, in the county of Hertford, Knight, Lieutenant-colonel, and Joshua Field, of Lambeth, in the county of Surrey, engineer, for their invention of improvements in the boiler and other apparatus for locomotive-carriages.* —[Sealed 20th August, 1833.]

THIS invention is the construction of a boiler for generating steam, intended to be applied particularly to locomotive-carriages. The boiler is constituted entirely of tubes, without any steam chambers; and by

the peculiar form of the tubes, it is intended that the steam and water, in its rapid circulation through them, shall be thrown with such force against a curved part of the tube, as to produce a separation of the water from the steam : the former passing downward from its gravity by the descending part of the tube, and the latter rising from its levity to the top, and proceeding upwards through a pipe, and thence to the induction valve of the steam-engine.

Plate XVII., fig. 17, is a sectional representation of a boiler, constituted by combined series of tubes bent to the form and connected in the manner shown : *a*, *b*, *c*, exhibits the form of one tube, through which the water circulates. A tube precisely similar in form and connexion is placed on the opposite side.

It is proposed to connect as many as thirty of these tubes in ranges on each side, standing vertically, all of them being inserted into the horizontal pipes *d*, *d*, placed longitudinally along the bottom. Through these pipes *d*, the water is to be injected by a force pump, until it has reached the level of the bent parts *e*, in all the tubes.

The furnace is intended to occupy the interior of the range, and the fire-bars to be formed by the horizontal parts of the tubes *a*, *a*. The heat produced by the ignited fuel acting upon all the tubes, causes the water to boil within; and the steam thereby generated rising to the top, passes from every tube up through the pipes *f*, *f*, to one general receiving tube *g*, which extends round the top part, and from thence the steam is conducted by a branch pipe to the engine.

The whole series of tubes are enclosed within a jacket or casing of a waggon shape; and at the top is the chim-

ney, through which the smoke and other vapours pass off into the air.

The particular feature of improvement in the construction of this tubular boiler is shown in fig. 18; which is a sectional representation of the upper bent part *e*, of one of the tubes, the arrow indicating the direction in which the boiling water flows.

It will be perceived that the boiling water and steam, as it rises in the tube *b*, will rush with considerable force against the curved surface at *e*; and by the resistance it there meets with, the water to become separated from the steam: the former descending by the tube *c*, and the latter rising up the pipe *e*, and passing off to the engine.

These parts of the tube may be connected together by any convenient means: union-nuts at the joints will perhaps answer the purpose best; but the form shown must be retained, as essential to the due operation of the boiler. Several gauge-cocks may be placed in the upper part of the tubes, for the purpose of ascertaining the height of the water within.

The second feature of the invention, viz. "other apparatus for locomotive-carriages," relates merely to the adaptation of the last described contrivance, to be applied for separating the water from the steam, after the steam has passed the eduction passage of the engine.

In conclusion, the Patentees say that their invention consists in the means by which an efficient boiler may be made entirely of tubes without a steam chamber; and the mode of separating the water from the steam by its momentum, causing it to strike against the surface of the bent tube.

The Patentees believe that the particular arrangement

of tubes as shown, applied to the construction of a boiler, is new; but they do not claim such arrangement, confining their claim to the part which causes a separation of the water from the steam in the boiler, and also its adaptation to the condensing parts of a steam-engine.—[*Inrolled in the Inrolment Office, February,* 1834.]

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*To* CHARLES ATTWOOD, *of Wickham, near Gateshead, in the county of Durham, glass-manufacturer, for his invention of a certain improvement or improvements in manufacturing or purifying soda.*—[Sealed 19th October, 1833.]

THE Patentee describes his invention as applying to the purification of such alkaline salts as are contained in the substances known in common by the names of soda, barilla, natron, mineral alkali, or kelp; or English artificial soda or barilla, or soda balls or lumps; whether such soda may exist in those substances, either in combination with earthy or other insoluble substances, or separate therefrom in solution or otherwise; and under whatever name the various articles of which soda, in either a caustic state or in combination with carbonic acid, may be obtained or made, if the improved process may beneficially apply thereto.

The impurity which is proposed to be removed by the improved process is the presence of sulphur, when found in chemical combination with the above-mentioned substances, in those states which are usually called *sulphurets*, or *hydro-sulphurets*, of soda. The improved process not applying to the separation of

sulphur from soda, when found in such combinations as are called *sulphates* and *sulphite of soda.*

The proposed *modus operandi* is this:—Precipitate the sulphur from its combination with the soda, by adding to a solution of soda a quantity of salts of iron, or of manganese, which it is preferred should be applied in a state of aqueous solution: when, on such solution being added to the soda, the sulphur will precipitate in union with the base of such metallic salt in the state of a metallic *sulphuret*, of a black or brown colour.

In order to guide the chemical operation in conducting this process as to the proper quantities required, it may be necessary to remark, that in proportion as the effect intended advances toward completion, the operation goes on more slowly, and the changes of colour to black or brown are more gradual; until at length, on the application of a suitable test (such as soluble salt of lead or silver) to a small portion of the former solution in a test glass, the base of such salt will be precipitated in a visibly mixed state, consisting in part of metallic sulphuret of the usual colour, and in part of such a colour as that salt usually produces in solutions of pure caustic or pure carbonated soda.

At this period of the process it is necessary to proceed with caution, and to give to the solution from time to time only small additions of such salts of iron or of manganese, in order not only to avoid waste, but also to prevent a part of the pure caustic or carbonated soda being converted into neutral salts of soda by combining with the acid of such salts, which sometimes happens when the salts are added in excess.

By attention to the foregoing observation, it will not be found difficult to regulate the quantity of the me-

tallic salts, so as to completely precipitate all the sulphur, without any material excess of the salt. But it will be necessary to wait for a short time between each addition of the salt, and occasionally to agitate the solution until all, or nearly all, such metallic precipitates, as may have fallen in another state than that of sulphurets, shall have passed into the latter state, by absorption of sulphur from the liquor.

After the whole of the sulphur shall have been perfectly precipitated, or as perfectly as may be deemed necessary, the precipitate may be separated from the solution either by subsidence or by filtration, or in any other way that may be found convenient.

The Patentee further states, that when the entire precipitation of such sulphur shall have taken place, the alkaline solution, which is usually of a yellow or greenish yellow colour, will have become nearly or entirely colourless and limpid; and will no longer produce, nor will the soda it contains produce, if separated, any of the injurious effects which it or they would previously have produced in discolouring such metallic matters, dyes, pigments, or mordants, as it or they would previously have discoloured; and will no longer act in such manner upon the surface or substance of metallic vessels, apparatus, or implements, as it or they would previously have done; or discolour or injure the quality of such soap as may be made by means of it or them.

It is also stated, that this invention of a certain improvement or improvements in manufacturing or purifying soda, is capable of being used, not only by manufacturers of soda in their works or manufactories, but also by other persons in other premises apart therefrom, and as a separate process of purification distinct

from manufacture, so as to be applicable to the purification of previously manufactured or of imported soda, or substances containing either caustic or carbonated soda, whether manufactured by themselves or others, and either for their own use or for the use of others. And that on this account he claims the application of such invention, not only as a process of manufacture, but also as a process of purification, capable of being used not only by manufacturers of soda, but also by dealers in the same, or by consumers thereof, for any use or purpose of trade or manufacture.

It is further observed, that all the following metallic substances may be more or less advantageously employed for the purification of soda—that is to say, in the first place, and in preference, all such salts of iron as that metal forms in combination with sulphuric, muriatic, nitric, or acetic acids, preferring such as may be most cheaply and conveniently obtained by purchase or manufacture, or as occasional residual products in certain manufactures; secondly, but less eligibly, all such salts of manganese as that metal forms with the aforesaid acids; but preference is given to the salts of iron, because no perceptible portion, if any, of that metal, or of its precipitate, is so acted on as to be dissolved, held, or retained in the solution or in combination with the soda or the salts of soda; whereas a small part of the manganese is sometimes, if not always, so retained, and constituted in some cases an objection to the use of its salts, where perfect freedom of the soda from metallic impregnation is desirable.

The Patentee considers it merely a question of economy, to be determined according to circumstances, what are the limits of the proportions between sul-

phuretted soda, and soda free from sulphur, whether in a caustic or carbonated state, in any alkaline compound, which shall determine the direct application of this invention to such compounds, without preparatory process, to be economically beneficial or advisable; but speaking generally, the less the proportion of sulphuretted soda may be, the more advantageously will the application of this invention be found, if directly, and without preparatory process, applied to the purification of such compound. In cases where the proportion of such sulphuretted soda approaches to near one-fourth of the total quantity of soda, free from sulphur, in such compound it will, in most instances, be advantageous (especially for manufacturers of soda, who usually possess the requisite facilities), to subject such compound of soda with sulphuretted soda previously to some of the usual carbonating processes, as they are called, and which are in common use, in order to get rid of the greater part of such contaminating sulphur, and afterwards to operate on the product, which is usually still contaminated with more or less sulphuret of soda.

For the guidance of manufacturers of soda, it is observed, that the three or the four first runnings from what is usually called a tank or vat of soda balls or lumps under the process of lixiriation, may be advantageously purified by the direct application of this invention, such first runnings usually containing but very little sulphuretted soda; but that with regard to all the subsequent runnings from such tank or vat after the third or fourth, it will be usually economical to boil the salt in solution down to dryness, and to carbonate the same in the carbonating furnace, or otherwise to carbonate the same by some known process in the liquid state

without such boiling down, and afterwards to purify it, by the application of this invention, from such portion of sulphur as it usually still remains contaminated with, even after the application of such carbonating process or processes.

The Patentee says, in conclusion, I do not mean or intend hereby to claim, as my invention, any process herein mentioned, which may be already known or in use; but I do hereby claim the improvement or improvements in manufacturing or purifying soda by the process or method hereinbefore described, of precipitating the sulphur by means of such aforementioned salts of iron and of manganese from such sulphuretted soda, as is usually found in mixture or in combination with caustic or carbonated soda, or with both, in the greater part of those articles or substances as found in commerce, of or to which such caustic or carbonated soda constitutes or gives the value, and which are much deteriorated by such sulphuretted soda.—[*Inrolled in the Inrolment Office, April*, 1834.]

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*To* JOHN and GEORGE ROGERS, *of Sheffield, in the county of York, cutlers, and Thomas Fellows, jun., of New Cross, Deptford, in the county of Kent, Gent., for his having invented an improved skate.*—[Sealed 18th January, 1831.]

THIS invention applies to the construction of skates for the feet, used in passing over smooth sheets of ice, and consists in the substitution of a thin elastic plate of steel, instead of the wooden soles usually employed for holding the skate-iron under the foot.

The skate-iron or sledge part of the skate of any of the ordinary forms, is to be made fast to the under part of the elastic sole, by rivetted pins passed through ears on the sides of the sledge-iron; and this attachment is to be only near the middle of the fore part of the sole, where the principal weight of the person bears, when in the act of springing forward.

The hinder part of the skate-iron is not attached to the sole plate, but stands free, allowing the elastic plate toward the heel to spring from the skate-iron by the bend of the foot to which it is securely strapped, the bearing parts of the skate-iron being enlarged in breadth to give stability.

It is considered that these elastic soles will afford more freedom of action to the feet of the skater than the wooden soles to which skate-irons are usually attached, and therefore will be much more pleasant and convenient to wear.—[*Inrolled in the Inrolment Office, March*, 1831.]

## ORIGINAL COMMUNICATION.

### ON MAGNETIC NEEDLES.

*To the Editor of the London Journal and Repertory of Arts, &c.*

Sir,—The importance of a perfect certainty of action in the magnetic needle is too obvious, in all the momentous applications of that instrument, to require at the present day to be dilated on. Innumerable lives and incalculable value of property are hourly confided to the in-

dications of this simple philosophical apparatus. Looking at its heavy responsibilities, it would seem that no labour would be too great, no cost too large, that could ensure the invariable accuracy of the needle. It is known to men of science, who have devoted their attention to the investigation of the laws of magnetism, that there are many inexplicable circumstances in the artificial communication of the magnetic power to steel bars, which affect the intensity, the durability, the uniformity of the influence, and leave always something of uncertainty in the proposed result. We cannot foresee the quantity of magnetic power which our manipulation shall impart to a needle, nor estimate the intensity or accuracy of its polar tendency. Much uncertainty seems to arise from diversity of internal structure of the metal; from its chemical or mechanical qualities; from irregularities in its previous treatment; or from partial violence in its fabrication. A blow will invert or derange the polarity of a magnetised bar. A magnetised body sometimes shows itself as if made up of a number of subordinate magnets, each indicating its own polarity; perhaps in all cases such may be the constitution of magnetic masses: yet in some there may be an arrangement of particles which shall lead to a perfect coincidence in the polar directions of the constituent magnets; whilst in others, the polar axes do not lie in the same line, or in parallel lines. In these latter instances, a contrariety of actions affects the ultimate result, and leads to a deflection from the common line of the magnetic meridian. Something of this kind must have place in very many of the common needles for ships' compasses, as they so frequently will be found to vary from each other, and from a true meridian, in their several settled lines of direction. This

will be matter of little surprise, when we observe how rudely most of these instruments are constructed. They appear to be abandoned, by tacit consent, to the slovenly management and unskilful manipulation of the coarsest manufactures. The ordinary compass needles are produced, not as philosophical apparatus, on the nicety and accuracy of which scientific results may be calculated, and great stakes risked without fear of error, but as wares of insignificant importance, which must fight their way in the market by the competitive lowness of their price. They are made of all shapes, sizes, weights, qualities, of material and mountings—not to indicate the true magnetic meridian, but to find a ship's-chandler who will buy them at so much a gross. It is lamentable to see great interests thus sacrificed, through ignorance or inadvertence, to the paltry cupidity of petty traders. The lives of a ship's-crew are of great moment to the community to which they belong; they expose themselves to the hazards of the sea for great objects, not their own, but their country's, or their employer's. Should they be perilled by a paltry saving of a few shillings in the cost of an instrument, on the accuracy of which the safety of themselves, and of their ships, and all which it carries, is based? The perfect truth of the ship's compass is not less important to safe navigation, than the correct going of a ship's chronometer. In the one instrument, the nicest care, the most dexterous skill, the most elaborate finish, the perfection of mechanical arrangement, the refinement of subtle computation, are sedulously employed, and competently rewarded. In the other, a Sheffield or Birmingham hardwareman competes with his rivals in the wholesale manufacture, by scamping the work and cheapening the prime cost of the mate-

rials. The vile article of trade is intrusted momentarily and incessantly with the ship's guidance; the costly scientific machine is consulted only from time to time, to check the reckoning it may be, or to correct, perhaps, the errors in the course, which the cheap commodity has perilously induced. Surely, if there be any means of reducing to certain rules the preparation of the magnetic needle, so that by any assiduity and care any number of these important instruments can be made always to indicate similar influences, and to point to precisely similar results, no extra cost of labour, or of material, or of scientific skill in conducting the manipulation, should deter from the employment of such superior means; since the expense of the compass, under such circumstances, could never amount to a sum worth consideration in the equipment of a ship, on whose safety, from skilful navigation, so large an amount of property, and so many valuable lives are hourly risked.

It appears that Dr. M. Smith, of Washington, United States, has made the subject of magnetism the chief object of his attention during a long course of years, and that he has attained a practical conversancy with the matter which perhaps few have surpassed. A sedulous and almost exclusive examination of the phenomena, comprised in the range of one isolated field of natural science, is almost certain to lead, in an inquirer of competent faculties, to a more familiar acquaintance with the more hidden facts, perhaps to an observance of their more subtle dependencies, and of the laws which govern their more obvious relations, than a great number of more general inquirers may chance to arrive at. The deductions of the patient but circumscribed observer may, perhaps, have less generality, less connexion

with associated classes of phenomena, less scientific precision, less philosophic acumen; but it is highly probable that they may have been drawn from a more particular knowledge, a more practised observation, a richer store of facts. Dr. Smith appears to have been one of those unwearied cultivators of a partial field, who, if they do not extend its bounds, commonly enhance its fertility, and penetrate into all its capabilities. This gentleman has passed a long life, for a great part of it under circumstances which, to the philosophers of Europe, may seem little appropriate to the successful pursuit of an obscure and delicate inquiry in physical science. In early life, Dr. Smith was made a prisoner, and afterwards adopted into the community of one of the native tribes of America; with them he was a denizen of the forest for many years, and eventually was chosen their chief. Whilst in this inartificial state of existence, commissioners from the government of the United States came to make a survey of the lands which his tribe occupied; he with the tribe met them, and in the interview had, for the first time, his attention caught by this singular phenomena of the magnetic needle. His faculties were rivetted upon the mysterious agency: after some consideration, he proposed to the commissioners to serve them in their business of the survey without any compensation, if they would teach him the nature and uses of that extraordinary instrument. The bargain was concluded, and under their instructions he became a practical surveyor. From that time, now near half a century ago, Dr. Smith has been an indefatigable observer of the facts, and an inquirer after the laws of the magnet. With none of the "appliances and means" which come now so familiarly in aid of the researches of European philosophers in phy-

sical science, he has devoted almost exclusively the untutored energies of a vigorous and acute mind to the study of his subject. The continuity and closeness of his inquiries may have led him to the observance of phenomena, which may have escaped less patient investigators. However that may be, Dr. Smith is evidently in great practical familiarity with the habitudes and management of the needles. But Dr. Smith, like all men who have not been immured in the closet, has not sought knowledge merely for the profitless possession of knowledge—utility, not barren speculation, has been his stimulus. Annoyed with the discrepancies amongst the common sort of compass needles, he set himself to the production of magnetic bars, which should have so much of identity of action, as to show that a common settled principle pervaded their production; and gives to them a character of certainty, which may impart confidence in their indications. Dr. Smith has succeeded in producing a needle, which, in the same place, uniformly settles itself upon the same magnetic meridian; and all the needles which he prepares, take the same line of direction. They appear to have more directive force, are less susceptible of local disturbance, and more permanent in their properties than the common needles of ship's compasses. Seamen who have used them say, that they are more steady in squally weather than those they have been accustomed to employ. These superior needles have been submitted to the examination of the officers of the naval department of the United States, who have tested them, tried them at sea, and have concurred in reporting favourably of the superior qualities which they possess. To afford to gentlemen interested in the accuracy of this important instrument, Dr. Smith will be happy to af-

ford them opportunities of inspection and examination, at the Museum of National Manufactures, Leicester-square, where he will be happy to give a meeting to parties wishing for such opportunity, intimated by a note addressed to him there.

Yours, &c.,
CHARLES TOPLIS.

Museum, Leicester-square.

## NOVEL INVENTION.

It is not easy to perceive at once how far philosophical playthings may, or may not, be made subservient to the demonstration of some unknown law in nature, or the development of some valuable fact connected with science. The circumstance of a disc of paper adhering to an aperture with the greatest tenacity, the greater the force of wind exerted to blow it away, excited considerable wonder, but formed for a time only a philosophical toy, until it was discovered that the same principles which caused this effect would operate upon the disc valves of high-pressure steam-engines; and thus an exceedingly important fact was made known, and its consequences guarded against.

The optical delusion of dancing figures changing their attitudes when viewed in a particular way, produced by the rapid rotation of a disc, on which many figures in different positions are painted, excited no small degree of surprise when first discovered, and has called forth considerable philosophical speculation as to the rationale of its cause; and though a plaything

only has yet been the product of the discovery, who can say what valuable lights science may not ultimately derive from the facts which this toy has developed.

We are induced to make these observations by way of introduction to the following communication, which, if assuming a trifling and unimportant character at the first glance, may, upon a consideration of the foregoing remarks, be allowed to claim a place among other scientific novelties of the day.

It must be well known to most of our readers, that when a figure is made to rotate at a *moderate* velocity, it is thereby rendered invisible, or its parts made to appear like ill-defined circles.

The following communication shows a mode by which figures may be seen as distinctly by the eye when revolving at a high velocity, as when in a state of quiescence :—

"*To the Editor of the London Journal and Repertory of Arts, &c.*

"Sir,—It may not be uninteresting to the readers of your valuable journal, to be informed of a mechanical method which I have lately discovered, that enables the eye to distinguish objects when moving at great velocities.

"Having conceived it probable that figures revolving on axes at right angles to their planes might be distinctly seen, I constructed an apparatus to determine the point: a short description and sketch of which I give you on the other side.

"A drawing of Saturn and his belt, about five inches diameter, was then made, and caused to revolve at the rate of 2,500 times a minute, when the figure was found to be almost as distinctly visible as it was when at rest.

"Other drawings were then tried, of a human figure, a toothed wheel, the number 1835, the letters R, R, &c., all of which were as distinguishable at that velocity as the first figure was.

"It appears to me very likely, that the same results would be found if the velocity were increased to 10,000 or even 20,000, revolutions per minute. I am constructing another apparatus, founded on the same principle, which will enable me to put the correctness of this anticipation to the test of experiment.

"I am, Sir,

"Yours respectfully,

"RICHARD ROBERTS."

"Manchester, Jan. 19, 1835."

Plate XVII., fig. 19, is an end elevation of the apparatus; fig. 20, is a sectional representation in the same direction; and fig. 21, is an elevation taken transversely; *a*, *a*, are two frame sides of wood screwed to the base *b*, supported by the spur pieces *c*, *c*, *c*, and connected at top by the piece *d*. The main shaft *e*, mounted in the standards, carries a cast-iron disc *f*, supported by twelve spokes *g*, *g*, *g*, of wood; and to these spokes are nailed segments *h*, *h*, of thin pasteboard.

In one of the segments a hole *i*, is cut one inch long by one and a quarter inch broad, and opposite to it another hole is made in the frame side, to which the spectator's eye is to be applied; *j*, is a small shaft supported by one of the frame sides, and by a piece attached to *d*; and *k*, is a pulley, two inches in diameter, to be driven by a band from the pulley *l*, of twelve inches diameter on the main shaft; *m*, is a strap pulley, by which motion from any first mover may be communicated to the discs; *n*, is

a winch handle of seven inches radius, by which 1,000 or 1,200 revolutions per minute may be given to the small disc *o*, on the shaft *j*, the centre of which is opposite to that of the eye-hole in the frame side. The small disc is of wood, and to it the figures to be viewed were attached. It will be evident that if the large disc be set in motion, the small disc will be made to revolve at about six times the velocity of the large one; and as the centre of the eye-hole is about two feet two inches from the centre of the disc, the figure on the small disc will perform only the one hundred and ninth part of a revolution each time that it comes under the view, and will appear to be at rest.

Owing to the difficulty of making pulleys work with unvarying relation to each other, a kind of jumping appearance was produced from a change of position in the figure: to obviate this, I used toothed wheels of six to one instead of pulleys, and then the figure ceased to change its position.

## New Patents

### SEALED IN ENGLAND,

### 1835.

To Andrew Smith, of Princes-street, Haymarket, in the county of Middlesex, engineer, for his invention of a new standing rigging for ships and vessels, and a new method of fitting and using it.—Sealed 12th January—6 months for inrolment.

To James Stewart, of George-street, Euston-square, in the county of Middlesex, piano-forte meker, for his invention of improvements on the mechanism of horizontal, grand, and square piano-fortes.—Sealed 15th January—6 months for inrolment.

To Alexander Shanks, jun., flax-spinner, in Arbroath, in the county of Forfar, in North Britain, for his invention of certain improvements in machinery for preparing and dressing hemp and other fibrous substances.—Sealed 15th January—6 months for inrolment.

To James Cherry, of the city of Coventry, painter, carver, and gilder, for his invention of certain improvements on bedsteads or apparatus applicable for the ease and comfort of invalids and others.—Sealed 15th January—6 months for inrolment.

To William Houston, of Fleet-street, in the city of London, printer, for his invention of certain improvements in type-founding.—Sealed 17th January—6 months for inrolment.

To John Streets, the younger, lace-manufacturer, and Thomas Whiteley, mechanic, both of Nottingham, for their invention of certain improvements applicable to that class of machinery commonly called or known by the name of warp-machinery, employed in the manufacturing of lace and other fabrics.—Sealed 22d January—6 months for inrolment.

To John Jervis Tucker, of Trematon-hall, in the county of Cornwall, Esq., for his invention of certain improvements on urns, to be used for tea, coffee, and other purposes.—Sealed 22d January—6 months for inrolment.

To John Day, of York-terrace, Peckham, in the county of Surrey, Gent., for his invention of an improvement or improvements in the construction of railways.—Sealed 22d January—6 months for inrolment.

To John Budd, of Liverpool, in the county-palatine of Lancaster, merchant, for a certain improvement or certain improvements in printing silk, cotton, calico, or other fabrics, and in the manufacture of blocks, cylinders, or rollers, used for such purposes.—Sealed 27th January—6 months for inrolment.

To Isaac Dodds, of Horsley iron works, in the parish of Tipton, and county of Stafford, engineer, for certain improvements in machinery for cutting and shaping wood and other materials, part or parts of which machinery are applicable to other useful purposes.—Sealed 29th January—6 months for inrolment.

## CELESTIAL PHENOMENA, FOR FEBRUARY, 1835.

| D. | H. | M. | |
|---|---|---|---|
| 1 | 12 | 19 | ♃'s first sat. will em. |
| | 21 | 36 | ♄ stationary. |
| | — | | Clock before the ☉ 13m. 53s. |
| | — | | ☽ rises 9 h. 19 m. M. |
| | — | | ☽ passes the mer. 3h. 10m. A. |
| | — | | ☽ sets 8 h. 53 m. A. |
| 3 | 6 | 48 | ♃'s first sat. will em. |
| 4 | 8 | | ☽ in Apogee. |
| 5 | 7 | 36 | ☽ in □ or first quarter. |
| | 20 | 37 | ☿ greatest Hel. Lat. N. |
| | — | | Clock before the ☉ 14m. 19s. |
| | — | | ☽ rises 10 h. 39 m. M. |
| | — | | ☽ passes the mer. 5h. 55m. A. |
| | — | | ☽ sets 0 h. 18 m. M. |
| 6 | 0 | 31 | ☿ in conj. with ♅ diff. of dec. 0. 59. S. |
| | 14 | 41 | ♃ in conj. with the ☽ diff. of dec. 0. 36. N. |
| 9 | 3 | 10 | ♂ in conj. with the ☽ diff. of dec. 2. 4. N. |
| | 5 | 32 | ♂ stationary. |
| | 6 | 0 | ♃'s second sat. will em. |
| 10 | 8 | 44 | ♃'s first sat. will em. |
| | — | | Clock before the ☉ 14m. 33s. |
| | — | | ☽ rises 1 h. 24 m. A. |
| | — | | ☽ passes the mer. 10h. 5m. A. |
| | — | | ☽ sets 5 h. 50 m. M. |
| 11 | | | Occul. γ in Cancri, im. 14 h. 34 m., em. 15 h. 35 m. |
| 12 | 22 | 59 | Ecliptic oppo. or ○ full moon. |
| 13 | | | Mer. R. A. 22 h. 40 m. dec. 9. 12. S. |
| | — | | Ven. R. A. 18 h. 36 m. dec. 18. 47. S. |
| | — | | Mars R. A. 6 h. 12 m. dec. 26. 55. N. |
| | — | | Vesta R. A. 3 h. 31 m. dec. 15. 31. N. |
| | — | | Juno R. A. 22 h. 33 m. dec. 7. 38. S. |
| | — | | Pallas R. A. 16 h. 57 m. dec. 6. 32. N. |
| | — | | Ceres R. A. 16 h. 55 m. dec. 18. 12. S. |
| | — | | Jup. R. A. 4 h. 1 m. dec. 20. 2. N. |
| | — | | Sat. R. A. 13 h. 29 m. dec. 6. 31. S. |
| | H. | M. | |
| | | | Georg. R. A. 21 h. 55 m. dec. 13. 23. S. |
| | | | ☿ passes the mer. 1 h. 9 m. |
| | | | ♀ passes the mer. 21 h. 5 m. |
| | | | ♂ passes the mer. 8 h. 40 m. |
| | | | ♃ passes the mer. 6 h. 28 m. |
| | | | Occul. ι in Leonis, im. 11 h. 38 m., em. 12 h. 32 m. |
| 15 | | | Clock before the ☉ 14m. 28s. |
| | | | ☽ rises 7 h. 57 m. A. |
| | | | ☽ passes the mer. 1h. 43m. M. |
| | | | ☽ sets 8 h. 36 m. M. |
| | | | ♅ in conj. with the ☉. |
| 16 | | | ☽ in Perigee. |
| | | | ☿ ascending node. |
| | | | Occul. 65 Virginis, im. 18 h. 1 m. |
| 17 | 0 | 1 | ♄ in conj. with the ☽ diff. of dec. 1. 25. S. |
| | | | Occul. κ in Virginis, im. 15 h. 31 m. |
| 18 | | | Occul. υ¹ in Libra, im. 15 h. 40 m. |
| 19 | 16 | 51 | ☾ in □ or last quarter. |
| 20 | | | Clock before the ☉ 14 m. 4 s. |
| | — | | ☽ rises 1 h. 35 m. M. |
| | — | | ☽ passes the mer. 6 h. 1 m. M. |
| | — | | ☽ sets 10 h. 18 m. M. |
| 21 | 5 | 57 | ☿ in Perihelion. |
| | 15 | 3 | ♃ in quad. with the ☉. |
| 22 | 15 | 57 | ☿ greatest elong. 18. S. E. |
| 23 | 1 | 55 | ♀ in conj. with the ☽ diff. of dec. 6. 16. N. |
| | 8 | 50 | ♃'s second sat. will im. |
| | 11 | 13 | ♃'s second sat. will em. |
| 25 | | | Clock before the ☉ 13m. 25s. |
| | | | ☽ rises 6 h. 39 m. M. |
| | | | ☽ passes the mer. 10h. 43m. M. |
| | | | ☽ sets 2 h. 54 m. A. |
| 26 | 0 | 46 | ♅ in conj. with the ☽ diff. of dec. 4. 19. N. |
| 27 | 0 | 28 | Ecliptic conj. or ● new moon. |
| 28 | 2 | 47 | ☿ in conj. with the ☽ diff. of dec. 8. 19. N. |
| | 19 | 25 | ☿ stationary. |

J. LEWTHWAITE, Rotherhithe.

# METEOROLOGICAL JOURNAL,

## FOR DECEMBER, 1834, AND JANUARY, 1835.

| 1834. | Thermo. | | Barometer. | | Rain in inches. | 1835. | Thermo. | | Barometer. | | Rain in inches. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hig. | Low. | High. | Low. | | | Hig. | Low. | High. | Low. | |
| Dec. | | | | | | Jan. | | | | | |
| 26 | 42 | 33 | 30,41 | 30,39 | | 10 | 52 | 38 | 29,54 | 29,51 | ,25 |
| 27 | 43 | 36 | 30,46 | 30,45 | | 11 | 54 | 40 | 29,49 | 29,48 | ,125 |
| 28 | 44 | 30 | 30,49 | 30,47 | | 12 | 51 | 41 | 29,58 | 29,48 | |
| 29 | 44 | 25 | 30,47 | 30,35 | | 13 | 53 | 42 | 29,69 | 29,55 | |
| 30 | 50 | 40 | 30,24 | 30,12 | ,125 | 14 | 52 | 38 | 29,46 | 29,43 | |
| 31 | 55 | 40 | 30,06 | 30,01 | ,05 | 15 | 53 | 40 | 29,64 | 29,49 | ,025 |
| 1835. Jan. | | | | | | 16 | 55 | 42 | 29,65 | 29,53 | |
| | | | | | | 17 | 43 | 27 | 29,56 | 29,50 | ,3 |
| 1 | 51 | 38 | 30,20 | 30,04 | ,225 | 18 | 41 | 25 | 29,46 | 29,29 | |
| 2 | 46 | 35 | 30,49 | 30,37 | | 19 | 43 | 33 | 29,19 | 29,09 | |
| 3 | 43 | 30 | 30,63 | 30,60 | | 20 | 36 | 26 | 29,64 | 29,46 | ,075 |
| 4 | 38 | 24 | 30,62 | 30,57 | | 21 | 34 | 19 | 30,06 | 29,89 | |
| 5 | 39 | 23 | 30,48 | 30,44 | | 22 | 40 | 30 | 30,16 | taty. | |
| 6 | 37 | 24 | 30,37 | 30,30 | | 23 | 45 | 31 | 30,14 | 30,12 | |
| 7 | 34 | 16 | 30,25 | 30,23 | | 24 | 49 | 38 | 30,08 | 30,06 | |
| 8 | 38 | 24 | 30,09 | 29,90 | | 25 | 51 | 39 | 30,11 | 30,06 | |
| 9 | 49 | 29 | 29,80 | 29,69 | | | | | | | |

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

THE

# JOURNAL OF ARTS AND SCIENCES

AND

# REPERTORY

OF

# PATENT INVENTIONS.

*CONJOINED SERIES.*

No. XXXV.

## Recent Patents.

*To* THOMAS SHARP, *of Manchester, in the county palatine of Lancaster, and* RICHARD ROBERTS, *of the same place, engineers, for certain improvements in machinery for grinding corn and other materials, being a communication from a foreigner residing abroad.*— [Sealed 1st January, 1834.]

THESE improvements in machinery for grinding corn and other materials, consist in a peculiar mode of adapting the two stones, or other cutting or rubbing surfaces, between which corn or other material may be ground or pulverised; the leading feature of which is, that the two stones, or other grinding surfaces, are made to revolve together upon centres which are excentric to each other.

The modes of mounting these grinding surfaces, and of driving them, as well as the materials of which such surfaces are made, admit of considerable variations; that is to say, the bearings by which such stones or other grinding surfaces are supported, and the mechanism by which they are driven, may be formed or constructed in several ways; and the grinding surfaces themselves may be of natural stone, or of artificial stone, or of metal, or of any other fit material.

In order to illustrate the principles upon which these improvements are founded, we have, in the accompanying drawings, exhibited mills or machines for grinding, in one of which the grinding surfaces are supposed to be of cast-iron or steel, and in the other of stone; the grinding surfaces in the former being made to turn horizontally, and in the latter, vertically.

Plate XVIII, fig. 1, is an elevation of a machine or mill, in which the grinders *a*, and *b*, are discs of cast-iron mounted in a suitable iron frame. Fig. 2, is a section of the same taken vertically through the middle; and fig. 3, is a plan or horizontal view of the same.

The disc *a*, which corresponds to the bed-stone of a mill, is larger in its diameter than the runner *b*, and is securely fixed to a vertical shaft *c*, which turns in an adjustable step *d*, at bottom, and in a neck and collar within the plummer box or loop *e*, above. The upper disc or runner *b*, is suspended by its tubular neck *f*, *f*, and collar in the upper part of the framework, and is held there by a loop or plummer box *g*, *g*.

The tubular neck *f*, *f*, forms the aperture through which the grain, or other material, is to be fed into the mill; and a finger *h*, affixed to the frame, extends over into the feeding aperture, for the purpose of stopping or arresting the descending grain, or other material, as

it is fed in, which would otherwise revolve or be carried round with the collar. A pinion *i*, is suspended by a neck and collar from the frame, and is held in that situation by the plummer box or loop *e*, before mentioned.

The vertical shaft *c*, is passed through the pinion, and they are locked together, when revolving, by a feather or rib *k*, on the side of the shaft *c*, which allows the grinding surfaces to be brought nearer together, or set further apart, as the quality of the grain, or other material, may require, by raising or lowering the step *d*, which is formed with a screw for the purpose of adjustment.

A horizontal axle *l*, mounted in suitable bearings in the frame, has a toothed wheel *m*, affixed to its inner extremity, which wheel takes into the pinion *i*; consequently, when rotary motion is given to the axle *l*, either by hand labour, through a winch *n*, or by steam, or any other power, through a rigger or gear, the vertical shaft *c*, and with it the lower disc or bed-stone, will be made to revolve horizontally, and in revolving, by the friction of contact, to give rotary motion also to the runner or upper disc *b*; between which surfaces the grain, or other material, gradually introduced through the neck *f*, will become ground or pulverised, and will be discharged from the grinding surfaces at their peripheries, whence it can be conducted, by any suitable casing, to a receptacle placed below (as shown by dotted lines in the drawings).

It will now be perceived, that by the axes of the two grinding surfaces being excentric to each other, and yet the surfaces revolving together, that the upper grinder or runner will, as it revolves, travel round upon the face of the lower grinder or bed surface, and that,

consequently, the points of contact between the two grinding surfaces, and the speed with which those points pass each other, will be perpetually changing.

The peculiar rotary movements of these grinding surfaces will produce greater friction upon the grain, or other material, under operation, and cause the mill to perform its work more perfectly and expeditiously than any other mills in which the grinding surfaces are of corresponding magnitude; and, also, these mills may be driven by a considerably smaller power than would be requisite to produce a corresponding quantity of work in mills of ordinary construction.

The figures in the drawings above described exhibit a convenient mode of adapting two metallic discs as grinders, intended to revolve horizontally; it must, however, be obvious, that French burrs, or other stones suitable for grinding, might be mounted, so as to work in a similar way.

Fig. 4, is a horizontal representation of the framework, axles, and grinders of a machine or mill in which a pair of stones are made to work vertically. Fig. 5, an end elevation of the same; and fig. 6, is a longitudinal section.

The larger stone corresponding to the bed stone is represented at *a*, the lesser stone corresponding to the runner at *b*. The larger of these stones is mounted upon a horizontal shaft *c*, turning in suitable bearings, supported by the framework, and which it is proposed to drive by a band from a steam-engine passed over a rigger *d*, or it may receive its motion from any other first mover. The lesser stone *b*, is securely affixed to, or mounted upon, a cylindrical tube *e*, to be inserted into a hollow cylindrical chamber or box *f*, within which it is intended to revolve. This box is fixed to

one of the standards of the machine, and is held fast by a staple or strap *g*, passed over the upper part of the box, and by a shaft *h*, at the back; the shafts *c*, and *h*, it will be perceived, have adjusting screws *i*, *i*, by which the proximity of the faces of the stones may be regulated.

The grain or other materials intended to be ground are to be fed by a hopper *k*, into the box *f*; and when the material or dry grain requires to be conducted forward through the tube *e*, toward the grinding faces, two spiral or twisted blades *l*, are attached to the end of the tube *e*: which blades, by revolving with the tube and the runner stone, lead the grain or other material forward into the tube by a sort of screw movement; and when the grain, or other material, has thus been brought into the tube, a straight blade *m*, made stationary within the tube, guides the grain, or other material, forward to the surfaces of the stones.

It is obvious that, instead of employing stones as grinders, steel, or other metal, plates or discs may be adapted in a similar manner.

In adapting stones for the grinding of grain, we make the working surfaces of both without grooves or furrows, and as nearly true or level as possible, excepting that it may be found desirable to rough one of the stones slightly by fine pecks, and to form some few nicks or indentations near the centre, as represented in the view of the face of a bed stone at fig. 7: and also the upper or runner stone may be very slightly dished in round the centre, and nicked in the form of a star, as shown in the view of the face of a runner stone at fig. 8.

When steel or cast-iron grinders are adapted, we have found it desirable to cut upon the faces of each

series of concentric circular grooves, bywhich means, as the two surfaces revolve together in the way described, the edges of these circles in passing each other will act as shears or cutting angles; but a similar effect may be produced by other kinds of grooves or indentations.

Having described convenient modes of constructing and working our improved machinery or mills for grinding grain and other materials, we desire it to be understood that we do not intend to confine ourselves to the details of such constructions, but claim, as embraced within our patent right, any and every variation of construction of machinery in which the two grinding surfaces of a mill, whether of stone or other suitable material, may be made to revolve together, in the same direction, upon pivots, axles, or axes, which are excentric to each other.—[*Inrolled in the Rolls Chapel Office, July*, 1834.]

Specification drawn by Messrs. Newton and Berry.

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*To* ROBERT STEPHENSON, *of Newcastle-upon-Tyne, in the county of Northumberland, engineer, for his invention of a certain improvement in the locomotive steam-engines now in use for the quick conveyance of passengers and goods upon edge railways.*—[Sealed 7th October, 1833.]

THERE are two objects proposed under this patent: the first of which is the adaptation of an extra pair of running wheels to a locomotive railroad carriage, which are to be attached to the driving crank axle, and to have no flanges round their fellies; the second is the adaptation of friction brakes to impede the progress of

the carriage when required, which are to be brought into operation through the agency of a piston in a small auxiliary steam cylinder.

The Patentee describes his invention as an "improvement in the locomotive steam-engines now in use for the quick conveyance of passengers and goods on edge railways," as "applicable to those locomotive engines which are used on the Liverpool and Manchester Railway: the first of which engines was called the Planet, having two main wheels (which were impelled by the engine) fixed on a double crank axis (*axle*), and turned by the force of the pistons of the steam cylinders, in order to advance the locomotive engine along the edge rails whereon the said main wheels did bear.

"My said improvement consists in making the said main wheels of the locomotive engine (which are fixed, as aforesaid, on the *axis*, and impelled by the force of the pistons) with plain tires to run upon the edge rails without any projecting flanges on those tires, and applying two additional small wheels with flanges on their tires beneath the hinder end or part of the engine, in order to cause that end of the engine, by means of those flanges, to keep straight upon the rails as it runs along thereon; and also to bear up part of the weight of the furnace end of the boiler in the same manner as the present two small wheels, by means of their flanges, keep that end of the engine straight on the rails, and bear part of the weight at the chimney end of the boiler, where the steam cylinders are situate."

Without repeating all the rigmarole treatise by which this specification is spun out over several skins of parchment, it will be sufficient to say, that by the rubbing of the flanges on the edges of the running wheels

against the sides of the rails, in passing along curves in the line, or turning into sidings or lateral deviations from the straight line, the friction has sometimes been found to be so great as to produce considerable strain on the engine, and on the driving crank axle to which the wheels were attached, and sometimes to break the crank axle, or parts of the machinery, or to cause portions of the flange of the wheel to be broken away, and by these means allow the carriage to run off the rail, to the great danger of overturning, and producing serious mischief.

To obviate this inconvenience, therefore, it is proposed by the Patentee to adapt three pairs of running wheels to each of his locomotive carriages: the main or principal pair of wheels being attached to the driving crank axle near the middle of the carriage, and having plain cylindrical tires round their peripheries running upon the top edges of the rails; while the fore and hind pair of wheels, which are attached to free and independent axles, have each a flange or lip on the inner edge of their tires, for the purpose of guiding the carriage, and confining it to the direction of the parallel lines of the railway.

Plate XVIII, fig. 9, is a longitudinal elevation of a locomotive carriage, the parts of which are of the ordinary construction. In this figure the improvements are exhibited in the way they are proposed to be adapted: *a*, is one of the pair of wheels that are attached to the driving crank axle, which, it will be seen, has a plain cylindrical tire running upon the top edge of the rail *b*, *b*. The fore and hind pair of wheels *c*, *c*, have each a lip or flange on their inner edges running against the side of the rail *b*, for the purpose of guiding the direction of the carriage. These wheels *c*, *c*, being

of the ordinary construction, have, of course, the same lateral friction against the sides of the rails as in other carriages; but from their attachment to axles which turn independently, the friction, though it should, in some degree, impede the progress of the carriage, cannot produce any strain upon the driving machinery. The wheels *a*, having no lip or flange upon their edges, are kept on the top of the rails *b*, by the direction of the fore and hind guide wheels; and hence, having no lateral friction, all tendency, from that cause, to strain the driving machinery with which these wheels are connected, is necessarily removed.

The second feature of improvement is described as consisting "in applying the force of small extra steam pistons or plungers, fitted into suitable cylinders, which, by turning a cock, can be supplied, when required, with steam from the boiler, in order to act upon a double brake or pair of clogs, which are applied to the circumferences of the tires of the said main wheels without flanges, and of the two said additional wheels with flanges, so as to press the said brakes or clogs in contact with the said circumference, and thereby cause friction and resistance, which will tend to retard the motion of the wheels, and consequently the advance of the engine along the rails, in order to stop the same when required."

This part of the improvement is shown in fig. 9, partly in section; a portion of the frame of the carriage and of the fore wheel being removed in the drawing, for the purpose of exhibiting it more clearly. Two blocks, clogs, or brakes *d. d*, are suspended by rods from a joint pin *e*, which is fixed in the side rail of the carriage. These brakes are also connected by jointed arms through a rod *f*, to a lever *g*, supported at

one end by a fulcrum pin in a socket upon the carriage frame. To the other end of this lever *g*, is attached a piston, working in a small vertical cylinder *h*; and a pipe *i*, leading from the boiler *k*, conducts steam into the lower part of the small cylinder; that is, at the underside of the piston.

When it is required to impede or stop the progress of the locomotive carriage, a cock in the pipe *i*, is to be turned, for the purpose of admitting steam from the boiler into the cylinder *h*, and thereby causing the piston to rise in the cylinder, and lift up the rod *f*, in order to bring the blocks or brakes *d*, *d*, from their pendent situation, as shown by dots, into close contact with the peripheries of the wheels *a*, and *c*; by the friction of which against the wheels, as they go round, the carriage will be impeded. When the carriage is required again to run freely, this pressure of the brakes must be taken off by letting out the steam from the cylinder, which will allow the blocks *d*, *d*, to fall away from the peripheries of the wheels into the position shown by dots.

The advantages of this contrivance over the ordinary mode of applying a brake by means of a hand lever, held on by the engineer, are expatiated upon by the Patentee, but which it will not be necessary for us to recite here.

The Patentee considers, that by the employment of six wheels to his carriages, he will be enabled to use boilers of larger dimensions, the additional pair of wheels sustaining the extra weight; and from the increased capacity of such boilers, they will not wear out so readily, because a less intensity of heat in the furnace will suffice to produce the required quantity of steam.

The Patentee says—"I wish it to be understood that I do not claim the use of six wheels instead of four as an improvement merely for better supporting the weight distinct from other circumstances hereinbefore set forth, but I claim the using of large wheels without flanges on their tires: which wheels are to be fixed on the crank axle to serve for the impelled wheels of locomotive engines, which are to travel on edge railways; and in conjunction therewith (but not without that conjunction) the application of a pair of extra small wheels with flanges on their tires beneath the under end of the boiler, with interposed bearing springs, like those of the other wheels; that application of extra small wheels with flanges conjointly with the using of large impelled wheels without flanges, being for the purpose of keeping the engine straight on the rails when it runs forward, as well as for bearing up part of the weight.

"And I claim also as part of my said improvement, the application (as hereinbefore described) of the pressure of steam or water from the boiler, to act when required, in hollow cylinders on pistons or plungers, which are connected with the clogs or brakes for wheels, so as to bring the said brakes or clogs into action by the pressure of the steam, instead of by the strength of men, as heretofore done.

"*Note*—I make no claim to the use of six wheels in locomotive engines to travel on edge railways, if the impelled wheels have flanges, but only when the said impelled wheels have no flanges."—[*Inrolled in the Rolls Chapel Office, December*, 1833.]

Specification drawn by Mr. J. Farey.

*To* WILLIAM GARROD, *of Davenham, in the county of Chester, gentleman, for his invention of improvements in manufacturing salt.*—[Sealed 25th January, 1834.]

THE Patentee commences his specification by stating, that in the manufacture of salt it is well known that the saline particles, as they become crystallised, fall down, and cover the lower part of the internal surface of the boiler or pan, from whence they are withdrawn, as occasion requires, by raking to the side; but that as the process goes on, some of the crystals adhere and accumulate on the bottom of the boiler, when, by the heat of the naked fire acting immediately against the bottom, the particles become baked, and harden into a crust, commonly called pan-scale, which, not conducting the heat away, causes the bottom of the pan or boiler to be very soon destroyed.

"Now the object of my invention is the placing a boiler, containing fresh water, in the midst of a brine pan; and over that part of the bottom thereof which is directly acted upon by the fire in the furnace; whereby the heat of the fire will act directly under such boiler, the heat passing to the brine through the sides of such boiler; and whereby the salt, as it forms and falls to the bottom, will not be directly acted upon by the fire, but will fall on parts of the pan not directly acted on by the fire."

The invention is then further developed by plan and section of a salt-boiling establishment, the essential parts of which are shown in Plate XX, at fig. 4. This figure represents, in vertical section, a boiler *a*, containing fresh water, placed over a furnace *b*, the boiler being encompassed at its sides and end with a

pan or vessel *c, c*, containing the saline liquor which is intended to be heated by its contact with the boiler.

The fresh water is introduced into the boiler from a reservoir above, through the pipe *d*, the cock of which is opened or closed, as may be required, by the rising and falling of the float. A pipe *e*, from the top of the boiler, leads off steam to a bath *f*, by which another pan *g*, containing saline liquor, is heated also, for the purpose of effecting the crystallisation of the salt.

The Patentee says—"By examining the drawing, it will be clearly seen that the boiler *a*, offers three surfaces to heat the brine contained in the pan *c, c*; that is to say, the two sides and end by which the brine in the pan will become heated; and the brine will be further heated by the flue from the furnace passing under the pan."

By this arrangement it will be evident that no salt will fall upon that part of the pan which is directly acted upon by the fire; and thus will the heat generated in the furnace be very advantageously applied, for it will be evident that that part of the heat which is not taken up by the brine in the pan will pass off in the form of steam, and heat the brine in the further pans *g*.

"To many salt pans there are two or more furnaces or fire-places; in which case I apply a boiler, containing fresh water, over each of those parts of the pan which are directly acted upon by such furnace, and either connect separate steam pipes to each, and thence to the pans, as described, or connect each of the boilers to one steam pipe, and thence to the pans."

The specification concludes by saying—"Having thus described the nature of my invention, and the manner in which the same is to be carried into effect, I would have it understood that I am aware that steam obtained from brine, as well as from fresh water, has

Fig. 6, is a view of the wheel No. 101, of the series M; fig. 7, is a view of the wheel No. 102, of series M; fig. 8, is a view of the wheel No. 103, of series M; fig. 9, is a view of the wheel No. 104, of series M; figs. 10, and 11, are explained in the drawings.

Fig. 12, is a front view of the machinery for making the open work; fig. 13, is an end view of fig. 12, without the series of wheels 57; fig. 14, is explained by the drawing; fig. 15, is a view of 62, in series M; fig. 16, is a view of 61, in series M.

Nos. 1, and 2, fig. 1, are common wood bobbins, having a wall on one or both sides, and upon which bobbins is to be warped fine blond silk, of which, and the carriage silk with which they act, the lace-net is to be made: 3, and 4, are like bobbins, upon which like silk is to be warped: 5, and 6, are groved bobbins, as shown at 6, fig. 2, into each grove of which is to be wound a thread of satin silk, or, as it is sometimes called, floss silk, such as is used in making French blond: 7, is a like bobbin, into each grove of which is to be wound a hard twisted floss or a corded silk: 8*, 8*, are like bobbins for like silk: 8, is a clawker, fixed on an axle, and is actuated by the right foot treadle, and borne by a spring against the ratchet wheel 11: 9, is a like clawker, attached in like manner, and actuated by the left foot treadle, and borne against the ratchet wheel 10: 10, and 11, are ratchet wheels, having but three teeth in each, and screwed at the distance of one, or one and a half, inches apart by the six screws 12, so that the teeth of either wheel shall just be midway between the teeth of the other; this wheel turns upon an axle o*: 13, is a lever, working about its middle on an axle o*: 14, is a rod, working on axles o*, at each end, and connecting the lever 13, with the bar 15, which slides freely in the staples 16, 16, and

has clawkers, 17, 17, which turn the series of wheels, M, and O, by their ratchet wheels: M, is a series of four shog and one ratchet wheel, turning on the axle N, which shog wheels are cut with indentations or shogs like the wheels, figs. 9, 8, 7, 6; fig. 9, being the top, 8, the next, and so on. No. 100, is the ratchet wheel, and has twenty-four teeth: all these wheels, except the top one, No. 104, are fixed firm upon the boss that turns on the axle N; but 104, is loose on the boss, and only makes half a revolution, while the other wheels make a whole revolution. This is effected by the point of a spring 106, fixed to the back stay-bar C, dropping into one hole of 104, and pressing down the pin 105; the point of the spring retains the upper wheel until the pin 105, and the other wheels, have completed half a revolution; the pin then enters the hole at the opposite side to where the spring is, and having a greater purchase on the wheel 104, then the spring has carried it half round, when the spring again acts upon the pin and detains the wheel: O, is a series of two shog and one ratchet wheel, turning on the axle P, and which shog wheels have the usual indentations, for making that kind of lace-net called washing blond or Lyons net: T, is a bar, shogging on axles, having two upright arms Q, in the top of which is fixed, on centres, the additional point bar R, having brass points of No. 20, wire, one inch and a half long, fixed into it: U, is a ratchet wheel, turning on the axle V, which must always have half the number of teeth of the ratchet of series M: W, W, are studs which, acting on the stud at Q, cause the points S, to quit the turn of the embroidery, and enter immediately over the embroidery above: U, U, are incline planes on V, and cause the bar T, to shog when the pins S, are in the

embroidery, and carry such embroidery out into a fan or scollop.

In fig. 1, the front additional point bar is only shown, in order to avoid confusion; but in fig. 5, both front and back, additional point bars are shown; the construction of both these point bars, and the mode of actuating them, are precisely similar: A, fig. 1, shows only the bottom tier of carriages in use: B, the arms fastened to the back tie-bar C, which arms have grooves cut in them for the bars F, G, H, J, K, L, to slide in, and plates of iron *b*, *b*, secured thereon, to keep such bars in their places: D, D, are lesser arms screwed to the needle-bar, and having like grooves for the bars F, G, I, K, L, to slide in, and like plates of iron *d*, *d*: E, is a lesser arm, with a hole for the end of the bar H, to slide in: F, is a bar, having the warp guides *f*, *f*, fixed in it, by soldering which is the means by which all the guides are fixed: G, is a bar, having like guides *g*, *g*: H, is a bar, having wires *h*†, *h*†, fixed in it, at the end of which are like guides *h*, *h*: K, is a bar having like guides at *k*, *k*: J, is a bar, having long guides *j*, *j*, made of No. 13, wire: I, and L, are bars, having berlin guides *i*, *i*, and *l*, *l*.

We will now describe the manner of applying our improvements, and manner of their working, supposing them to be applied to an old machine. Commence with their application to a traverse warp machine, in order to produce narrow, embroidered, or ornamented lace, similar and resembling French blond lace; and to facilitate the understanding of this specification, we have made the same to describe a pattern, called "*Reige*," and which is well known to every person in the lace trade, and which we have found to be the best key to other patterns.

We commence by taking away that part of the machine called the joining machine, which includes the fork-bars cradle in which they swing, and all such parts as are solely used to actuate the same. Then remove the spools, and all such parts as are solely used to actuate the same, and thoroughly clean the remaining part of the machine, so as to remove all the dirt of every kind; [for it must be borne in mind, that if it be necessary to resort to any process for cleaning the lace, it will be next to worthless;] prevent both the needle and comb bars from shogging by fixing them; take out all the carriages, and bend the points of the combs by closing them, as shown in fig. 19, so as to close the entrance to the spaces that were occupied by the blades of the upper tier of carriages; then replace the lower tier of carriages, having first wound the bobbins with silk; then take out a carriage between every breadth of lace, which, in the pattern to be described, will be every ninth carriage.

We prefer using the lower tier of carriages; but the upper tier, or every alternate upper and lower tier carriage may be used, or all the carriages; but in such cases, the points of the combs must not be bent; then screw the arms B, B, to the back tie-bar C, and the lesser arms D, D, to the needle-bar, and put in the bars F, G, H, I, J, K, L, as shown in fig. 3; then fix the axles N, and P, on the needle-bar, and put thereon the series of wheels M, and O; then the additional point bars R, R, and parts shown therewith in fig. 5, as necessary to actuate the same: next fix the different parts as numbered from 8, to 17, in figs. 1, and 2, and the bobbins 1, to 8†, as likewise there shown: thread the guides *h*, *h*, with threads from bobbin 1; the guides *k*, *k*, with threads from bobbin 2; the guides *f*, *f*, with

threads from bobbin 3; the guides *g*, *g*, with threads from bobbin 4; the guides *j*, *j*, with threads from bobbin 5; the guides *i*, *i*, with threads from bobbin 7; the guides *l*, *l*, with threads from bobbin 6, all one thread in each guide: fasten all these threads to the work roller, and put over the back points to make them straight, then set the series of wheels M, so as the ends of F, G, J, L, shall bear against the edge of the series M, at No. 1—see figs. 6, 7, 8, and 9; and the spring No. 106, bears on the pin No. 105, so as to detain the wheel No. 104; and set the series of wheels O, any where that the carriage threads shall twist round them the right way, that is, the contrary way to which the sun revolves round the earth. Now pass the carriage into the back bar, and let out the front pins; press down the left foot treadle, which will put over the front pins, and cause the chamber 9, to take a tooth of the ratchet 10, and pull it and the ratchet wheel 11, one-sixth round, when a screw 12, pressing against the lower end of lever 13, will give a lateral motion to the bar 15, and the clawkers 17, 17, will draw the two series of wheels M, and O, round one tooth: the screw 12, quits the end of the lever 13, just at the end of the treadle motion; and the elastic spring 18, by pulling against the bar 15, returns to its former position.

The left-hand end of each of the bars L, J, and G, will be borne against those parts of the wheels 101, 102, 103, as are marked 2, in figs. 6, 7, and 8; and as the wheel, fig. 6, is the only one that has a shog from 1 to 2, the bar L, will be shogged over three carriages. The clawker Z, when the front points were let out, would take hold of the tooth just below it of the ratchet U; and, upon the pins being put over, would move it round one twenty-fourth part.

The foot is now taken off the left foot treadle, when the front point descends, taking down the threads that were shogged in the guides *l*, *l*, after the same manner as the weft thread of common weaving is driven by the sley: the carriages are now to be passed into the front bar; the back pins are let out, and the right foot is to be pressed on the right foot treadle to put the back pins over, which produces, by the clawker 8, a repetition of the same operation on series of wheels M, and O; but the ratchet U, is moved round one-twenty-fourth part by the driver Y, instead of by the clawker Z.

The edges of the wheels, figs. 6, 7, and 8, marked No. 3, will now be borne against by the bars L, J, and G; and as 102, fig. 7, is the only one that has a shog from 2, to 3, the bar J, will be shogged over three carriages: the right foot is now taken off the right foot treadle, when the back pins descend, taking down the threads that were shogged on the guides *j*, *j*, after the same manner as the weft of common weaving; pass the carriages into the back bar, let out the front points, and press down the left foot treadle, which will put over the front pins, and repeat the same movement on the series of wheels M, O, and U, and return the bar L, to its first position by the shog on the edge of fig. 6, from 3, to 4, and the threads shogged in the guides *l*, *l*, are taken down by the front pins, as before; pass the carriages into the front bar, let out the back pins, press down the right foot treadle, which will put over the front pins, and repeat the same movements on the series of wheels M, O, and U; the bar J, is returned to its first position by the shog on the edge of fig. 7, from 4, to 5, and the threads shogged in the guides *j*, *j*, taken down by the back pins, as before; pass the carriages into the back bar, let out the front pins.

By pressing the left foot treadle, the additional front points s, will now, by a stud w, acting on the stud q, be withdrawn from the lace, and the small weight s†, will cause the points to rise; and when the stud w, quits q, the points will return over the weft threads and outside of the carriage threads, as shown at *r*, *r*, fig. 10: the same operations of passing and repassing the carriages, and putting over the points, are continued without intermission; the front additional points are drawn out and return, as described above, by a stud w, at Nos. 6, 10, 14, and 18, of fig. 7, being shogged while in the weft by the inclines *u*, *u*, at 10, and 14; the back additional points are, in like manner, drawn out and returned into the weft at Nos. 11, and 15, at fig. 8, but at the contrary side of the weft at *r*, fig. 10.

Now it will be seen, on looking at figs. 6, and 7, that from 17, to 1, there is a perfect plain on each wheel without any shogs, and, consequently, the bars j, and l, will not shog during the period they are bearing against the plain part; and on looking at fig. 8, it will be seen that all the shogs are from 18, to 24; so while j, and l, are at rest, the bar g, shogs, and the threads from the guides *g*, *g*, along with the carriage threads, become converted into net, instead of remaining stationary, as they did from 1, to 17, and forming the warp threads of the embroidered part.

Now, as when the series of wheels m, commenced moving, the point of the spring 106, pressed on the pin 105, and retained the wheel 104, this wheel 104, would remain stationary during the pin 105, entered the hole at 13, of fig. 9, when the wheel 104, would be carried round with the wheels 100, 101, 102, and 103; and, as the first shog on the wheel, fig. 9, is at 7, the bar f,

which carries the warp threads, would remain stationary during the time that the other wheels of series M, were passing from 1, to 19; and as the carriages do not shog, there would be no twisting of these threads, but on the arrival of that part of the wheel 104, marked 7, fig. 9, at the end of the bar F, each carriage thread will make half a twist round its warp thread, and a successive half twist at 8, 9, and 10, making, in the whole, two twists round each warp thread proceeding from the guides *f*, *f*; and as, on the arrival of the hole 13, in which is the pin 105, such spring will drop upon the pin 105, and, pressing out the pin 105, retain the wheel 104; and it will not be, until that part of the other wheels of the series M, numbered 19, have arrived at the ends of the bars G, L, J, that that part of the wheel 104, fig. 9, marked 19, will arrive at the end of the bar F, during which time the threads proceeding from the guides *i*, *l*, will have woven another flower or pattern like the first.

When the bar F, falls into the bottom shog 19, of fig. 9, it will shog to the left instead of the right, as at 7; consequently, each carriage thread will be twist round the next thread, instead of the same thread each twisted round last, except the outside carriage thread of each breadth, which this time has no thread to twist round.

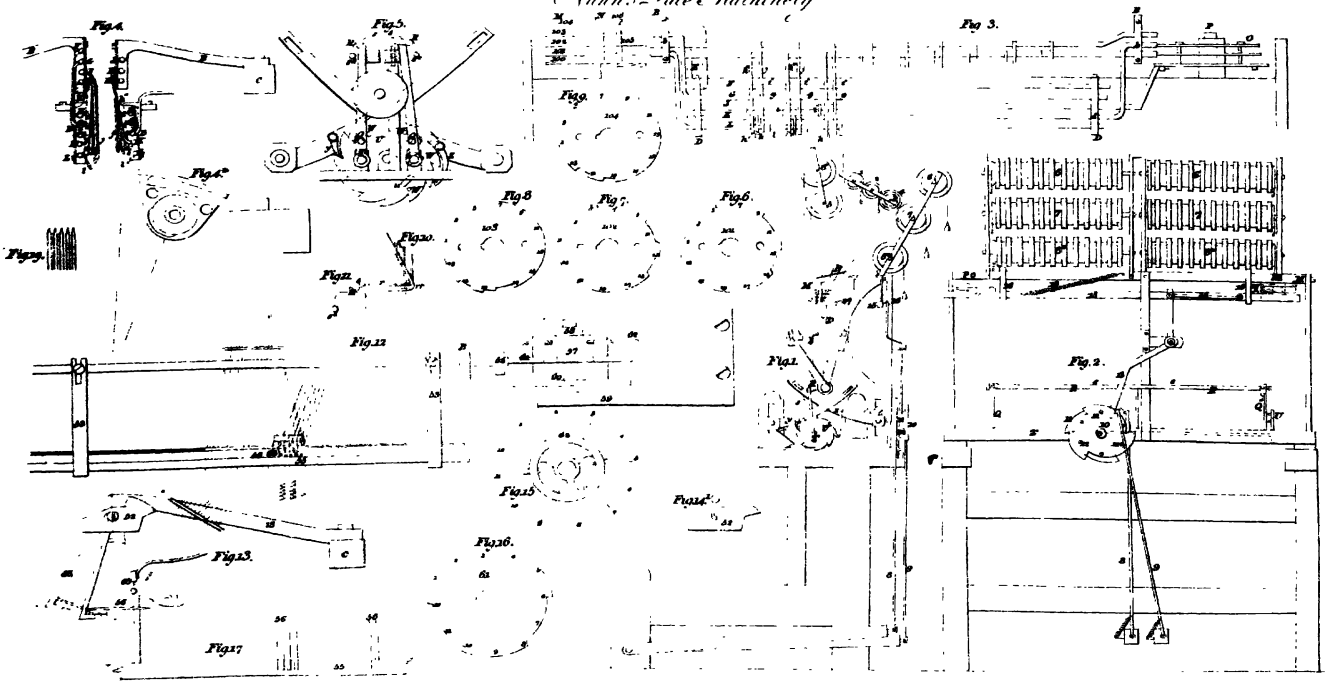
Now the purpose of this twist being put in, is to prevent the embroidered or woven edge from being frayed, and the reason of the carriage threads being only alternately twisted round the same threads, is to make the embroidered or woven edge lay flat; but it is not always necessary that the carriage threads should be twisted round the warp thread, there being patterns which do not require it: but it is advisable to construct the machine so, in order to change the pattern with less hindrance.

Now it is clear, from the foregoing description, that the embroidered part already described is composed of a perfect cloth-work or weaving; and the change of pattern is to be effected by varying the depths of the shogs or indentations, and increasing or lessening the number of them, and also the size of the wheel in series M, and of the teeth in ratchet 100, and which ratchet must always have an even number of teeth.

If embroidered lace, wider than three-fourths of an inch, is to be made on a traverse warp machine, the machine and spools, and all the parts necessary to actuate them, must be replaced in a perfect clean state; and if only every alternate carriage is used, removing every alternate fork, and also such others as would interfere with the warp threads, as no forks are there required, and cutting the shogs of the adjoining wheel as deep again, and guides like *j*, *j*, be substituted for those *h*, *h*, and berlin guides for *k*, *k*, into which are to be threaded threads from 8*, 8*, to be used in like manner as *j*, *j*, and *k*, *k*, or for running round the weaving and open work, and a series of wheels like 100, and 101, and 102, of series M, be substituted for series O.

Having hereinbefore shown and explained the application of our improvements to a traverse warp machine, we now proceed to explain how such improvements as we use for producing narrow embroidered lace, and resembling French blond lace (as made by hand, with bobbins, on the pillow), are equally applicable to such other bobbin-net machinery as traverses the carriages: for it must be obvious to any mechanic, who is acquainted with bobbin-net machinery, that if there is removed from a traverse warp machine one tier of carriages, or every alternate carriage, and the

# Nunn's Lace Machinery



shogs of the bars in which such carriages move, and also the fork-bars cradle in which they work, and such parts as are solely used to actuate the same, and also the spools and such parts as are solely used to actuate the same, as we have heretofore directed; and that if there be removed from a machine traversing the carriages, one tier of carriages, or every alternate carriage, and the shog of the bars in which such carriages move, and the one or two guide bars and thread roller what remains of each machine will be essentially the same; and that all of our improvements shown in the drawing, from fig. 1, to 11, are equally applicable to such other machinery; and that the same mode of applying the same, and the same mode of working the course, are fit directions for adding such improvements; only that in machines in which the work goes upward the improvements must be inverted, and in all the pin-bars be made to rake from the points of the guides. Fig. 4, and fig. 4†, if inverted, will further show the application.

We will now describe the second part of our invention, that of making open work. Now, the principle upon which this open work is formed, is that of throwing (during the process of making) into each mesh intended to be converted into open work, a portion or moiety of the twist that is usually put into the mesh just immediately above, whereby the meshes, having the larger quantity of twist, are increased in size; and those having the lesser, and those having tapes, are decreased in size.

Fig. 12, is affixed to a traverse warp machine, in a fit state to make bobbin-net, and having the guides 65, affixed, ready for work, wherever it is intended to make the open work; which guides are used in the same way, as is usual, for making such tapes, that is, taping every alternate row of meshes. When it is in-

tended to make the open work perfect at each edge, then there must be as many more guides, and one over, as there are points, to make each open work, as at 56, and 65: the points 56, in the bar 55, are as far again apart as the guides 65; and these points must be set so as their pointed ends may take into every alternate space that has no tape, as *o, o, o, o,* 56, fig. 12, when the end of 51, shall bear against the wheel 61, at 1, fig. 16.

The series of wheels 57, are set so as the end of 51, shall bear against the wheel 61, at 1, fig. 16, and the end of the screw 1, of fig. 15, will be over the end of the bar 51, as shown at fig. 14*; and so as the points 56, shall retain the first crossings that are to be made.

A course is now to be worked precisely the same as for making common bobbin-net, that is to say, three half twists; then bring the fork bars forward, when a driver, fixed on the cradle of the fork bars, will move round the wheels 57, one twenty-fourth part; and a clawker on the same cradle will, when the fork bars return, pull them round another one twenty-fourth part: the bar 51, will then bear against the wheel 61, at 2; but as there is no shog on 61, from 1, to 2, see fig. 16, nor any screw at 2, of fig. 15, the points 56, will not be moved, and will, therefore, retain the crossings that the fork bars make above them, so that the pins which are now to be put over in taking down the crossings cannot take those above the points 56.

Now proceed with another course, and when three half twists have been put in where the crossings have been retained by the points, the three half twists will be added to the three half twists which have already been put into the upper parts of the meshes below; the fork bars are now to be brought forward, when the

series of wheels 57, being moved round one twenty-fourth part by the driver, as before, the screw 3, of fig. 15, will pass to the top of 52, and cause the point 56, to be carried out of the threads, as shown by the dotted lines at 66, fig. 13, and permit the crossings that were retained above the points to descend, so that they may be taken down by the pins. The fork bars now returning back, the clawker, as before, pulls the wheel 57, round another one twenty-fourth part, when the end of 51, will bear against the wheel 61, at 3, see fig. 16, and shog the points over the threads to the right, and the screw 3, will pass off the top of 52, and allow the points to return into the threads where shown by black dots in fig. 12. Two more courses are now worked, and the wheels 57, and parts connected with the points, are actuated in precisely the same manner as the black dots, fig. 12, as already described, and make the open work, before the points 56, are withdrawn from the threads, every second course, by a screw 62, fig. 15; and being shogged by the wheel 61, at every odd number of 61, see fig. 16, alternately enter the threads at the open dots and black dots, and form the open work of the net. The foregoing direction is for making the open work in stripes lengthwise of the lace. In order to make it in patches in various parts, the series of wheels 57, is made to shog on 59, by an extra wheel fixed thereon.

Having now described the nature of our invention, and the manner of carrying the same into effect, we would observe that we are aware that several of the parts which are shown and described are known and in use in the lace trade for other purposes; we therefore only claim them to effect "our improvements in the machinery used in the manufacture of bobbin-net

lace, for producing certain kinds of embroidered or ornamented lace;" and we do hereby declare, that these our improvements, consist in producing in bobbin-net machines, in a perfectly finished state, embroidered or ornamented lace, similar to and resembling that made on the pillow, and known by the name of French blond lace, by causing carriage threads, together with warp threads (from a bobbin or beam), to act as warp threads, for receiving the ornamenting satin threads as weft threads, in like manner, for weaving. The various movements for effecting this object being produced in bobbin-net machines, by the addition of the various shogging bars and guides, with the other lettered parts shown in the drawing, together with the additional point bars R, for producing the scalloped edges to the blond lace; and it is by such additions and improvements that we are enabled to produce embroidered or ornamented lace, similar in appearance to that made on the pillow, that is, being partly woven, or having the ornamental threads laid between the warp and carriage thread, similar to the weft in weaving; and the other parts produced in the ordinary manner of forming lace and our open work.

Secondly, we claim the producing an open work in traverse warp machines, resembling an open work made by hand with a needle on bobbin-net, by putting (during the process of making) unto each mesh, which we intend concerting into open work, a moiety of the twist that in common bobbin-net is put into the mesh just immediately above, and lacing in the manner of tapes, the intermediate and each row of meshes outside of such open work, as above described.—[*Inrolled in the Inrolment Office, August*, 1833.]

*To* THOMAS JOHN HAMILTON, *Earl of Orkney, and* JOHN EASTERN, *engineer, both of Taplow, in the county of Bucks, for their invention of certain improvements in machinery, or apparatus for propelling vessels on water.*—[Sealed 26th July, 1834.]

THIS invention of certain improvements in machinery or apparatus for propelling vessels on water, consists in a peculiar mode of adapting rotary pistons in connexion with revolving, excentric, conducting shields, formed by segments of cylinders sliding one within the other, as the pistons go round.

In the accompanying drawings, see plate XX. Fig. 1, is a plan or horizontal view of part of a vessel in which this improved propelling apparatus is adapted: *a*, *a*, are the rotary pistons, each turning horizontally upon its pivot at bottom in a brass step. Fig. 2, shows one of the pistons detached in its vertical position, as it would appear when presenting its broad surface, showing an aperture through for the free passage of the water within the cylindrical shield.

The upper part of the spindle of each rotary piston turns in a brass collar with a stuffing box, and to each of the spindles above is attached a bevel pinion, which receives the teeth of the driving wheel connected to the crank shaft of the steam-engine. The channels *b*, *b*, *b*, for the passage of the water, are formed with plates of iron, bent to the required curves, and securely fixed in erect positions, by means of flanges bolted to top and bottom plates *c*, *c*, *c*. The excentric conducting shields are formed by segments of cylinders of thin metal *d*, *d*, and *e*, *e*, the latter sliding within the former. The segments are required to be about two-thirds of the

circumference of a complete cylinder, and are enabled to slide round in circular groves formed in brass rings *f, f,* fixed by flanges and screws to the top and bottom plates *c.* The water enters the channels *b, b,* at *g, g,* in the sides of the vessel, and is discharged at *h, h,* toward the stern. The rotation of the pistons *a, a,* cause the water in the channels *b, b,* to be taken hold of by the arms of the pistons projecting from the cylindrical shields, and the water is thereby forced back toward the stern with a similar effect to that resulting from the action of the ordinary paddle-wheel; the vessel being by these means propelled in the opposite direction.

It will be perceived that as the axis of the propelling pistons stand in excentric situations with reference to the interior of the sliding cylindrical shields, that the rotations of the pistons will cause the two segments of which each cylinder is formed to slide with differential movements, according to the position of each piston; and in order to reduce the friction of the surfaces, they are kept about the eighth of an inch apart by a thin collar or rim of brass in the groves of the rings *f, f,* at top and bottom. Anti-friction rollers may also be mounted at the inner edges of the segments, to relieve the friction of the pistons.

Fig. *3,* is a longitudinal section of a vessel, in which our improved propelling apparatus is shown acting upon a horizontal axis in a vertical direction, and which may be made of nearly the same width as the vessel: *a,* is the paddle; *b, b,* the channel for the water to pass, and which may be made to branch off at the stern, to clear the stern-post and rudder; *d,* and *e,* are the two segments of cylinders working one within the other, as above described. The piston being made to revolve by toothed gear applied near the ends of its

shaft, will act upon the water in the same way as other rotary paddles, and propel the vessel forward.

Lastly, we desire it to be understood, that we claim as our invention the adaptation of the rotary piston in excentric connexion with the sliding segments of cylinders, for the purpose of propelling vessels on water, whatever may be the position of such pistons and segments of cylinders, or by whatever means they are actuated.—[*Inrolled in the Rolls Chapel Office, January*, 1835.]

Specification drawn by Messrs. Newton and Berry.

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*To* JEFFERY SHORE, *of Blackwall, in the county of Middlesex, boat-builder, and ship-smith, for his having invented an improvement or improvements on tackle and other hooks, which he denominates the self-relieving hooks.*—[Sealed 1st November, 1830.]

IT has been found that very considerable inconvenience sometimes arises from the difficulty of disengaging the pendent hook from a load, or heavy body, which has been raised or lowered by a crane or a pulley-block; the object of the Patentee, therefore, is, to construct a suspending hook, and so to mount it in connexion with its carriage or pulley-block, that as soon as the tension of the suspending rope or chain is relaxed, by the heavy body coming to a bearing or resting place, the hook shall, by its own gravity, turn over on its axle or pivots, and thereby disengage itself from its connexion with the load.

Plate XVIII., fig. 10, shows a pulley-block *a*, with a pendant hook *b*, attached by a pivot or axle *c*, to the frame or straps of the block, and in the act of raising a heavy package *d*. Fig. 11, is the same pulley-block and hook after the package has been released from the hook.

It will be seen that a weight or logger-head *e*, forms the upper part of the hook above the axle or parts on which the hook is suspended in the straps or carriage, and that the weight of the pendent package *d*, keeps the hook in the perpendicular position, shown by fig. 10; but as soon as the package is brought to a resting place, and the tension of the pulley rope or chain is released, the gravity of the logger-head, or counter-weight *e*, turns the hook over into the position shown in fig. 11, and thereby causes the hook to slip out of the loop of the package without any assistance from the attendant.

It will thus be perceived that whatever the goods raised by the crane or pulley-block, the hook will, as soon as the tension of the pendent weight is removed, turn upon its axle or pivots by the gravity of the counter-weight, or logger-head, and immediately release itself without the necessity of being disengaged from its attachment, and thereby save a very great deal of trouble and occasional inconvenience.—[*Inrolled in the Inrolment Office, January*, 1831.]

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*To* JOHN LINTON, *of Selby, in the county of York, brasier, for his invention of an improved construction of steam-boiler.*—[Sealed 29th January, 1833.]

THIS boiler is formed by a series of long, narrow, vertical chambers set apart from each other, and opening into broad, but shallow, horizontal chambers, which are all to be occupied with water. The furnace placed in the lower part of the interior of this boiler has its flues carried in contorted channels to and fro, between the water chambers, for the purpose of communicating the heat thereto.

Plate XX., fig. 6, is a section taken vertically through the boiler, exhibiting the positions of the water chambers, and of the flues which pass between them: *a*, is the furnace, from whence the flues *b*, *b*, *b*, proceed in contorted directions, between and round the water chambers; *c*, *c*, *c*, are the horizontal water chambers of the boiler, communicating with the vertical water chambers *d*, *d*, *d*.

The horizontal chambers, it is to be understood, extend over the whole horizontal area of the boiler, except at those parts where the flue proceeds up through them; and the vertical chambers extend from side to side of the boiler, except at those parts where the flues pass round and between them.

By means of this arrangement, a very extended surface of the water vessel is presented to the action of the fire and heated vapour, and the steam thereby generated rising to the top of the upper chamber, passes into the steam-chest *e*, and from thence through the pipe *f*, to the steam-engine: the smoke and heated vapour proceeding from the flues through the throat *g*, into the chimney *h*.

The Patentee claims, "placing a series of flues within a boiler case, so as to form a number of deep, narrow, vertical, in connexion with shallow, horizontal chambers, or ways for the water to flow through, in the manner shown."—[*Inrolled in the Inrolment Office, July*, 1833.]

*To* JOHN SQUIRE, *of Paddington-basin, engineer, and* FRANCIS MACERONE, *of Upper George-street, Bryanston-square, both in the county of Middlesex, for their invention of certain improvements on boilers for generating steam.*—[Sealed 18th July, 1833.]

THE subject of this patent is a tubular boiler of a peculiar construction; it is intended to be enclosed within a square case, having a dome top, much in the shape of an ordinary bird-cage.

The water chambers are formed by vertical tubes, set in ranges of nine in a series, connected together by small transverse tubes placed horizontally. Nine of these series of tubes are combined together, making in the whole eighty-one vertical tubes, as constituting the boiler, and from each of the series pipes at top lead off the steam into a steam chamber, from whence it is conducted to the steam-engine.

Plate XX., fig. 7, represents the boiler, drawn in isometrical perspective, divested of its outer casing; *a*, *a*, *a*, are one series of nine perpendicular tubes, connected together by small horizontal tubes at top, and also at bottom, the latter of which form the fire-bars of the furnace within. Three of the perpendicular tubes are cut short at their lower ends, for the purpose of making a way through for the fire-place.

Similar series of perpendicular tubes, *b*, *b*, *c*, *c*, *d*, *d*, *e*, *e*, *f*, *f*, *g*, *g*, *h*, *h*, and *i*, *i*, with their horizontal tubo at top and bottom, are connected to the former, and when so combined constitute the boiler, in the middle of which the furnace is constructed, and from whence the flames and heated vapours pass round and between the perpendicular tubes, and thence into the chimney.

Above the tubes, a cylindrical vessel *k*, is placed, as a

steam chest, and into this chest the steam is conducted, from the several series of tubes, by inclined pipes *l*, *l*, *l*, *l*.

The case employed to enclose this boiler has a flap in front, through which the fuel is to be conducted by a hopper to the furnace. A door is also provided, opening into the furnace for stoking, and one below to the ash-pit. An aperture behind leads off the smoke to the chimney; and through the case, in suitable places, are passed cocks or valves, inserted into the tubes of the boiler, for introducing the water, for gauging the steam and the height of the water within; safety valves are also adapted, and a mercurial syphon tube to exhibit the pressure of the steam.

The Patentees say, in the conclusion of their specification, that their "invention consists of a combination of cylinders in the manner above described, for forming a boiler, particularly applicable as a light, and at the same time a powerful, boiler, which will be found highly valuable for the purposes of locomotive carriages, and other uses."—[*Inrolled in the Inrolment Office, January*, 1834.]

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*To* JOSEPH MAUDSLEY, *of Lambeth, in the county of Surrey, engineer, for his invention of an improvement in the structure of certain boilers for producing steam, for the working of steam-engines.*—[Sealed 7th October, 1833.]

THE object of the Patentee, in the peculiar construction of boiler described in this specification, is to obtain a very considerably extended heating surface, by means of the flues, and to bring the water in the boiler into

contact with every part of this heating surface, by circumscribing the flues with narrow cylindrical water-ways.

The mode in which this object is proposed to be effected, is by forming the boiler of a series of cylindrical tubes, placed one within the other; one general water-way communicating with all the cylinders, thus connecting the series of tubes, and constituting the whole as one water vessel or boiler: through the narrow channels, between which tubes the smoke and heated vapour is intended to pass as flues, from the furnace to the chimney, and by communicating the heat in its passage, to cause the steam to be rapidly generated from every part of the boiler, and to be accumulated in a steam chamber placed above.

Plate XX., fig. 8, is a longitudinal elevation of the boiler, part of which, with the furnace, is shown in section: *a*, *a*, is the internal cylindrical tube, round which all the other tubes are mounted; *b*, *b*, *b*, is the second tube, formed by two plates, connected together at their ends, which constitutes a cylindrical vessel of shallow capacity, but extended surface; *c*, *c*, *c*, is a similar cylindrical vessel, placed on the outside of the former; and *d*, *d*, *d*, is also a similar cylindrical vessel of larger diameter, on the outside of *c*, the whole being circumscribed by the external cylindrical vessel *e*, *e*, *e*.

The spaces between these respective cylindrical vessels constitute the flues, leading from the furnace *f*, into the chimney *g*; and the steam generated by the boiling of the water within the respective vessels, passes up by the communicating channel *h*, into the steam chamber *i*, and thence by a pipe *k*, to the induction valve of the engine, or, if required, may be allowed to blow away by the pipe *l*, into the chimney.

The channel *h*, by which the several cylindrical tubes are connected, and through which the water flows, is formed by an aperture, as the Patentee describes it, like a man-hole from the top, passing through all the tubes, the channel being rendered water and steam tight by flanges and hoops. The water is introduced into the boiler by a vertical pipe *m*, from whence it passes by horizontal pipes *n*, *n*, *n*, into the respective vessels *a*, *b*, *c*, *d*, and *e*.

It is proposed that the several cylindrical vessels, *b*, *c*, *d*, and *e*, should be placed a little excentric to the tube *a*, in order that the lower part of each cylindrical tube should have a greater space for the free passage of the water, than the upper part of such tube, which carries off the steam; and in order that as little of the heat may pass off by radiation as possible, the sides and top of the furnace are formed by a double plate of iron, constituting an auxiliary boiler, which receives its water by the pipe *o*, and discharges its steam by the pipe *p*, the furnace being supplied with fuel through the aperture *q*, in front.—[*Inrolled in the Inrolment Office, April*, 1834.]

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There is no specific notification set out in the specification of the above patent, by which the reader can be led to discover the particular feature of improvement intended to be claimed by the Patentee; the principle upon which the boiler is constructed, viz., by shallow extended cylindrical vessels, enclosed one within another, and surrounded by the flues leading from the furnace, is not new; that construction of boiler having formed a prominent feature in the specification of a

patent granted to Dr. Church, and dated 29th November, 1830; the particulars of which are given in the eighth volume of our Second Series, p. 1, and plates I. and II.

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*To* WILLIAM HENRY BARNARD, *of New Broad-street, in the city of London, gentleman, for his invention of "a solvent not hitherto used in the arts."*— [Sealed 20th August, 1833.]

MY invention consists in an essential oil or liquid, which I obtain by the distillation of a well-known article of commerce, imported into this country from Para, Valparaiso, Sincapore, and other places, under the title of caoutchouc, or Indian rubber, which is to be performed in the following manner:—

I take a mass of the said caoutchouc, or Indian rubber, as imported, and having cut it into small lumps, containing about two cubic inches each (which I prefer), I throw these lumps into a cast-iron still (which I find adapted to the purpose, and a diagram of which is annexed to, and forms part of, this my specification), with a worm attached, see Plate XX., fig. 5: A, is the still; B, the cover ground to a metallic fit, and held down with cramps and set screws, through the cover there is a hole with a plug ground to fit, to admit of a thermometer to take the temperature; C, the fire-place; D, the ash-pit; E, the worm-tub and worm; F, the brick-work of still; G, a roller and carriage, in conjunction with a crane, or other means, to raise the cover to take out the residue, and to charge the same; H, the chain.

I then apply heat to the still in the usual manner, which heat is increased until the thermometer ranges at 600 degrees of Fahrenheit, or thereabouts. And as the thermometer ranges progressively upwards to 600 degrees of Fahrenheit, a dark-coloured oil or liquid is distilled over, which I claim as my said invention; such liquid being a solvent of caoutchouc, and other resinous and oleaginous substances. When the thermometer reaches 600 degrees, or thereabouts, nothing is left in the still but dirt and charcoal.

I have found the operation of distillation to be facilitated by the addition of a portion of this oil, either previous or subsequent to rectification, as hereinafter mentioned, in the proportion of one-third oil to two-thirds caoutchouc, or thereabouts.

I afterwards subject the dark-coloured liquid thus distilled over to the ordinary process of rectification, and thereby obtain fluids, varying in specific gravity, of which the lightest hitherto has not been under .670 taking distilled water at 1,000; which fluids I also claim as my said invention.

At each rectification the colour of the liquid becomes more bright and transparent, until at the specific gravity of .680, or thereabouts, it is colourless and highly volatile.

In the process of rectification (for the purpose of obtaining a larger product of the oil colourless), I put about one-third water into the still. In each and every state the liquid is a solvent of caoutchouc, and several resinous and oleaginous substances, and also of other substances (such as copal), in combination with very strong alcohol.

Having experienced much difficulty in removing the dirt which adheres to the bottom of the still, I throw

into the still lead and tin in a state of alloy (commonly called solder), to the depth of about half an inch; and as this becomes fused, the dirt which lies on the surface of it is more easily removed.

Objections having been made to the smell of this liquid, I have found such smell removed by mixing and shaking up the liquid with nitro-muriatic acid, or chlorine, in the proportion of a quarter of a pint of the acid (of the usual commercial strength) to a gallon of the liquid.

And whereas I claim as my invention, the said solvent or liquid when first distilled over, and in each and every stage of its rectification.—[*Inrolled in the Inrolment Office, February*, 1834.]

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The discovery of the chemical solvent, which forms the subject of the patent above described, has excited considerable interest in the philosophic world, not only from its extensive usefulness as a new article of commerce, but also from two very extraordinary characteristics which it is found to possess; viz., that in a liquid state it has less specific gravity than any other liquid known to chemists, being considerably lighter than sulphuric æther, and in a state of vapour is heavier than the most ponderous of the gases.

The properties of this singular production are yet but in a small degree developed. Dr. Faraday, of the Royal Institution, and Dr. Hue, of St. Bartholomew's Hospital, have both directed their attention to the subject, and have given to the solvent the denomination of *caoutchoucine*, as the distilled product of *caoutchouc*, the elastic gum, known under the common name of Indian rubber.

This elastic gum is produced by a variety of trees, and is found in all countries at or near the Tropics. The Havea Caoutchouc (whence the name) grows in South America; the Urceola Elastica in Sumatra; the Ficus Elastica and Ficus Indica (Banyan) in various parts of the East Indies; the Artocarpus Incisa (bread fruit-tree) in the West Indies—we have it also from Africa, but from a variety of trees. Those above enumerated are clearly of totally different descriptions, some growing as climbing plants, some as forest trees. These trees yield the fluid in immense quantities; it is said, in some instances, as much as two-thirds the weight of the boughs whence it is drawn, and when exhausted by repeated tappings, renew the supply after a few months' rest.

Mr. Faraday stated the component parts of a quantity of the fluid he had analysed to be as follows :—

| | |
|---|---|
| Caoutchouc - - - - - - | ,317.0 |
| Albuminous matter - - - | 19.0 |
| Azotic, bitter colouring matter - - | 70.0 |
| Wax - - - - - - - | 1.3 |
| Soluble substance - - - - | 29.0 |
| Water, acid, &c. - - - - | ,563.7 |
| | 1000.0 |

Its elements—

| | | |
|---|---|---|
| Carbon - - | 6.812 - | 8 proportions. |
| Hydrogen - - | 1.000 - | 7 proportions. |

There is not a particle of oxygen in the fluid after distillation, when in its most highly-rectified form, and it is capable of preserving potassium. It mixes readily with pure alcohol, but refuses to do so as soon as its specific gravity increases. We do not know at what exact weight a separation takes place, but imagine,

from reported experiments, that at a specific gravity of 0.75, it will no longer unite with alcohol. This fluid is obtained at all the intermediate gravities between 0.68 and 0.88. Perhaps if these operations were conducted with very great nicety, and the caoutchouc could be procured, divested of all foreign matter and impurities, water, &c., we should obtain by distillation the precise weight of fluid for the weight of solid operated on.

The speedy evaporation of the caoutchoucine, of course, produces intense cold; it has been found to reduce the thermometer 10 degrees below zero of Fahr., from 60 degrees above, in a minute and a quarter. At about 10 degrees above zero, a very remarkable concretion takes place resembling snow on the bulb of the thermometer, termed by Dr. Faraday the Bicarburet of Hydrogen; and it is believed that this is one of the new products alluded to, as discovered by Professor Mitscherlich.

Dr. Ure first exhibited this experiment, which may easily be repeated, by tying round the bulb of the thermometer a piece of thin muslin, and blowing upon it with a pair of bellows while the fluid is dropped upon it.

If a current of hydrogen gas be made to pass through the highly-rectified liquid, it will carry up with it a considerable portion, and become an illuminating gas of great brilliancy and beauty. This experiment was tried by Dr. Hue at the Hospital Laboratory; and the combination of the two vapours remained perfect several days, though the application of greater cold might have caused them to separate.

If the hydrogen gas and the highly-rectified fluid could be *cheaply* procured, a most excellent portable light would be the result; but the expense of both is at present a bar to such a plan.

This new material is a solvent for all the resinous gums, and particularly for gum copal, which it dissolves without artificial heat, at the ordinary temperature of the atmosphere: a property possessed by no other solvent known; and hence it is particularly useful for making varnishes in general. It also mixes readily with oils, and will be found to be a valuable and cheap menstruum for liquefying oil-paints; and, without in the slightest degree effecting the most delicate colours, will, from its ready evaporation, cause the paint to dry almost instantly.

Cocoa-nut oil, at the common temperature of the atmosphere, always assumes a concrete form; but a portion of this caoutchoucine mixed with it will cause the oil to become fluid, and to retain sufficient fluidity to burn in a common lamp with extraordinary brilliancy.

The importance and singularity of this new material has induced Dr. Faraday to bring it under the notice of the members of the Royal Institution, before whom, in a very interesting lecture, he explained and exhibited many of its properties; and we cannot better close our observations on this subject, than by giving a report of the Doctor's lecture.

The lecturer commenced by describing the process adopted by the Patentee for decomposing caoutchouc, and converting it into the new spirit or material denominated caoutchoucine; and observed that, those who are not acquainted with the very extensive works erected by Messrs. Enderby and Company, at Greenwich, in whom the patent right is vested, it may be interesting to know, that the preparation and manufacture of the New Zealand flax, for the production of ropes and cordage, has been a principal object of their exertions; and that in prosecuting this manufacture, in which they have spared neither talent nor expense, in

order to render the ropes impervious to water, and preserve them from the destructive effects of damp by saturating the fibres in a solution of Indian rubber, they have been led to the discovery which formed the chief subject of the lecture.

The great urbanity and freedom with which Messrs. Enderby have shown this establishment to their numerous scientific visiters, is a feature so different from the usual calculating secrecy of mercantile houses, that we deem it right to notice the circumstance as an omen of a more enlightened age, wherein all shall be willing to impart those seeds of knowledge and of truth, which, while they do not injure the parent tree, become the prolific source of benefit to the public at large.

After exhibiting living specimens of the plant from which the caoutchouc is manufactured, of the sap, which appeared like cream, and of the various forms in which the Indian rubber is imported, the Doctor alluded to its first introduction into commerce about 70 years ago, when it was sold by Mr. Nairne, the mathematical-instrument maker, of Cornhill, in cubical pieces of about half an inch square at 3*s.* each, which he recommended as a convenient means of destroying the traces of black lead pencils; whence it derived the name of Indian rubber, which it still retains.

Such a limited application of caoutchouc continued until within a very few years of the present time; but latterly it has been found available to a multitude of purposes connected with manufacturers and the mechanical arts, so much so, that we learn the quantity now imported into this country exceeds the enormous sum of 200 tons per annum.*

* Previous to October, 1832, the duty levied upon elastic gum (as it was called) was 5*d.* per lb., or nearly 50*l.* per ton. Its extensive introduction was thereby entirely precluded. The Legis-

Messrs. Enderby have at this time more than 100 tons actually in process of operation at their manufactory, where it is used, when melted with tar, for dressing or paying, as it is called, the ropes and cordage, manufactured by them from the New Zealand flax, and also for the distillation of the caoutchoucine spirit above alluded to, which is coming largely into use for the various purposes stated.

In the production of light, about one quarter of the caoutchoucine dissolves the cocoa-nut oil, and forms an excellent fuel for lamps; one of which (a French Argand) was exhibited on the lecture table, and burnt with peculiar brilliancy. Dr. Faraday then alluded to another application of this spirit to the lamps invented by Mr. Beale, who was present, and exhibited their action. This lamp, which has been made the subject of a patent, we shall probably describe in our next.

After briefly adverting to the various important applications of caoutchouc by Messrs. Mackintosh, Hancock, and others, to articles of domestic and surgical clothing, beautiful specimens of which were exhibited, Dr. Faraday proceeded to the more immediate object of the lecture; and in speaking of the composition of caoutchouc, particularly adverted to the extraordinary quantity of carbon contained in it; namely, 68 of carbon to 10 of hydrogen: forming what is termed a hydro-carbon. The lecturer then placed a very small quantity of the cream-like sap in a capsule over a spirit-lamp, by which the caoutchouc was coagulated

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lature have, subsequent to that period, reduced the duty to 1*l.* per ton; hence its increased importation and consumption, which is still greatly increasing.

The supply of this material is inexhaustible; the banks of the River Amazon, as reported by Messrs. Enderby, agents sent out expressly for that purpose, are covered with forests of trees producing it in large quantities, and from Java alone the world might be supplied.

into a solid substance, and appeared in surprising quantity, more especially as the sap had already deposited an immense quantity of solid caoutchouc in the bottle from which that small quantity was poured. Dr. Faraday then remarked as an extraordinary fact, that the composition of the caoutchouc did not seem altered, although its properties are completely changed when, by melting, it is converted into a viscid matter incapable of again coagulating; and when by a still higher heat it is distilled over into the spirit termed caoutchoucine (10 parts of which are obtained from 12 of solid caoutchouc, and when rectified has a specific gravity of .680, being lighter than ether, and presenting a most remarkable instance of the quantity of solid matter that can be suspended in a liquid form).

What is most extraordinary in the opinion of the Doctor is, that this very liquid is itself a solvent for caoutchouc in a natural state, and deposits it on evaporation unaltered, affording a grand desideratum in the arts, and promising a most abundant source of useful manufactures.

Caoutchoucine is extremely volatile; and yet its vapour is so exceedingly heavy, that it may be poured, without the liquor, from one vessel to another like water. A portion of the vapour was poured into an open glass vessel, which, of course, seemed to contain nothing, and yet, when carried towards a lamp, placed at the extremity of the lecture table, and then inverted, or rather the vapour poured out into the flame of the lamp, when it immediately inflamed, and thus most satisfactorily establishing its presence in the open glass vessel; and consequently its weight, which had prevented its escape through the vessel, had been removed, affording a most satisfactory proof of these facts, and of amusement to the spectators generally.

## COURT OF CHANCERY.

*BEFORE LORD LYNDHURST.*

LINCOLN'S-INN HALL, 26th AND 27th FEBRUARY.

*Wolfe and Danchell.*

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THIS was a question as to which of the two parties were entitled to Letters Patent under the Great Seal of England, for an invention of improvements in piano-fortes. The subject has been several times before the Court, and was now finally heard and disposed of.

The history of the case is this:—Dr. Pelisoff, Professor of Philosophy at Munich, in conjunction with an eminent musician of the Bavarian Court, discovered an important improvement in the construction and form of the sounding-board (or sounding-body, as they termed it,) of a piano-forte, which, by being shaped according to certain acoustic principles, would cause the notes given out, by sounding the strings, to be very considerably louder, and greatly superior in the quality of their tones to the notes of any piano-fortes at present in use.

In order to bring this discovery into operation, the Doctor employed Messrs. Danchell and Greiner, musical-instrument makers at Munich, to construct a piano-forte for him, embodying the improvement as regarded the sounding-body, leaving them to execute the same while he came over to England.

Dr. Pelisoff, while in England, communicated his discovery to Mr. Wolfe, a musical-instrument maker, in London, and agreed to send over the instrument to England as soon as it was finished, for the purpose of taking out a patent; and in order to protect the inven-

tion from being pirated here, caveats were entered in the offices of the Attorney and Solicitor-General as a protection, until the invention could be matured here, and brought here for the purpose of obtaining a patent in the name of Wolfe.

On the return of the Doctor to Munich, he found that the instrument had not been made exactly in conformity with his orders; that by the bad construction of certain parts which lie concealed, the acoustic principle was destroyed, and that its effects did not meet his expectations; and finally, he found that Messrs. Danchell and Greiner had secretly made an instrument for themselves, with a sounding-board, or sounding-box, something resembling his, and had obtained a patent for the same from the Bavarian Government. The business was immediately taken out of the hands of Messrs. Danchell and Greiner, and proceedings at law issued against them in the Municipal Court at Munich, when the decision was favourable to Dr. Pelisoff. Appeals were made to the superior courts of Bavaria; but in all cases the decision was given against Messrs. Danchell and Greiner; and their patent was accordingly revoked by the Bavarian Government, and granted to Peliso.f.

Mr. Danchell came to England, and applied for a patent here through an agent in London; and notwithstanding the existing caveat on behalf of Mr. Wolfe, it appears that by some oversight of the clerks in the Attorney-General's (Sir John Campbell) office, the agent of Mr. Wolfe was not informed of Mr. Danchell's application, and therefore had no opportunity of entering opposition on Wolfe's behalf, so as to bring the two inventions before the Attorney-General for his consideration as to their identity.

In this position of the affair it was accidentally discovered by the agent of Wolfe, that Danchell's patent had proceeded to the Bill-office of the Attorney-General; and before any available steps could be taken, the Attorney-General's signature to the bill had been obtained, and it had passed out of his hands.

The only mode of proceeding now left was for Wolfe to solicit a patent for the invention, and to enter a caveat at the Great Seal-office against Danchell's patent, which was accordingly done by the agent of Wolfe; and, on the application of Danchell's agent for the Great Seal to be appended to his patent, the subject came before Lord Chancellor Brougham, who, for the better investigation of the whole matter of inquiries on both sides, referred the two patents back again to the Attorney or Solicitor-General for his report, as though the patents had neither of them proceeded further than that primitive stage.

The hearing of both parties took place before Mr. Solicitor-General Rolfe, attended by many witnesses and counsel on each side: at the close of which the Solicitor-General reported, that two points in the invention claimed by Danchell did not interfere with the invention claimed by Wolfe; but the third point, the sounding-body, did appear to be identical, or founded upon the same principle as that in Wolfe's invention, and therefore he could not advise his Majesty to grant the pat[redacted] to Danchell.

The report having been approved by the Lord Chancellor, an application was now made on the part of Danchell to oppose the sealing of Wolfe's patent, and the whole of the affidavits were again read, and the subject argued by Sir William Horne and Mr. Rotch, on behalf of Danchell; and by Mr. Hill, Mr. Kindersley,

and Mr. Russel, on behalf of Wolfe. The history of the transactions in Germany were gone into, and the progress of the invention described as it advanced to its present state of perfection, over which he extended the strings of the instrument in the same form as in the ordinary piano-fortes; the effect of which would be, that though some of the notes unquestionably might be improved, others would be very considerably deranged.

The exact form of Wolfe's sounding-body was not explained by his counsel, and as it did not appear that Danchell's party knew its form, or could point out its acoustic principles, the Lord Chancellor was of opinion that the petition of Danchell was not supported, as he opposed an invention without being able to explain what that invention was, therefore it could not be supposed to be his own invention, as he pretended it to be, and the patent must, of course, issue to Wolfe; and Danchell might have his patent for the two points that did not interfere; which was accordingly directed, each party paying their own expenses.

The discovery of Dr. Pelisoff appeared to be founded upon a consideration that if a box or hollow chamber, as that of a violin or guitar, having an aperture in the upper side, were placed immediately beneath the strings of a piano-forte, it would cause the strings to emit a much more powerful sound than the plain sounding-board usually employed in those instruments; but the particular form and construction of this box (or sounding-body, as it was termed), was only to be discovered from a careful investigation of the scientific principles of acoustics.

An oblong hollow box, with straight sides, had been employed by an instrument-maker in Vienna; but this had not been found to answer the desired effect,

its form not being that indicated by the theory of acoustics.

Dr. Pelisoff first tried a sounding-body in the form of an inverted cone or funnel, supported at its apex, and the strings extended over its broad base, which carried the bridge. This form was changed for that of a hollow hemispherical box, like a kettle-drum, and subsequently to an elliptical form, or like the half of an egg bisected through its transverse axis. This last shape approached nearest to the proper figure of a sounding-body; but as the principles of acoustics required that the deepest and longest part of the box should be immediately beneath the longest or base strings, it required, in such a formed sounding-body, that the base strings should pass over the middle of the elliptical face of the box, and hence a great difficulty arose as to the arrangement of the keys and the acting part.

It did not appear that Danchell had approached the principle nearer than the elliptical figure.

## New Patents
## SEALED IN ENGLAND,
## 1835.

To William Evatt Wright, of Regent-street, in the city of Westminster, gentleman, for his invention of certain improvements in tea and coffee urns and tea kettles.—Sealed 27th January—6 months for inrolment.

To Joseph Gibbs, of Kennington, in the county of Surrey, and Joseph Gatley, of Whitechapel, in the county of Middlesex, engineers, for their invention of certain improvements in machinery for cutting wood and other materials.—Sealed 27th January—6 months for inrolment.

To William Morgan, of the Kent-road, in the county of Surrey, Esq., for his invention of certain improvements in steam-engines.—Sealed 27th January—6 months for inrolment.

To Benjamin and Joseph Cook, of Birmingham, brass-founders, for their invention of certain improvements in beds and mattresses.—Sealed 31st January—6 months for inrolment.

To John Bethell, of Mecklenburgh-square, in the county of Middlesex, gentleman, for his invention of certain improvements in apparatus for diving and working under water, and inspecting from above objects which are beneath the surface of the water.—Sealed 31st January—6 months for inrolment.

To Thomas Roberts, master-shipwright, of his Majesty's Dock-yard at Plymouth, for his invention of an improved mode of joining pieces of timber together end to end, which improved mode is applicable to the purposes of making the masts and top-masts of ships; also for making piles, and for certain other purposes wherein timber is required to be lengthened, whereby an immense saving will accrue; inasmuch as masts can be lengthened or made from common fir timber, top-masts from shorter and less expensive sticks, and piles made to any required length.—Sealed 6th February—6 months for inrolment.

To Charles Cleveland, of Falcon-square, in the city of London, clerk, for certain improvements on pens, on pen-holders, on apparatus for the supplying of ink to pens, and on apparatus for the making of pens, being a communication from a foreigner residing abroad.—Sealed 9th February—6 months for inrolment.

To James Alstead, of Burr-street, St. Catherine's, in the county of Middlesex, sail-maker, for his invention of a new and improved paddle-wheel for steam-vessels, which wheel is also applicable to mill machinery of every description moved by water.—Sealed 9th February—6 months for inrolment.

To James Leeming, of Manchester, in the county of Lancaster, worsted-spinner, for his invention of certain improvements in the construction of water-wheels and of paddle-wheels.—Sealed 9th February—6 months for inrolment.

To Rowland Hill, of Tottenham, in the county of Middlesex, gentleman, for his invention of certain improvements in certain methods of letter-press printing by machinery.—Sealed 12th February—6 months for inrolment.

To Edwin Norris, of Walworth, in the county of Surrey, gentleman, for his invention of an improved machine for letter-press printing.—Sealed 12th February —4 months for inrolment.

To Thomas Alcock, of the parish of Claines, in the county of Worcester, lace-manufacturer, for his invention of certain improvements upon certain machinery for making bobbin-net lace, being further extensions of certain improvements for which Letters Patent were granted to him on the 8th of December, 1832; part of which extensions are for the purpose of producing ornamented bobbin-net lace.—Sealed 12th February—6 months for inrolment.

To James Hendrey, of Wormwood-street, in the city of London, surveyor, for his invention of an improved method in laying, or a new combination in the construction of floors in buildings.—Sealed 16th February—6 months for inrolment.

To Joseph Price, of the parish of Gateshead, in the county of Durham, flint glass-manufacturer, for his invention of certain improvements in railways, and in the means of transporting carriages from one level to another.—Sealed 16th February—6 months for inrolment.

To Samuel Burrell, of Birmingham, in the county of Warwick, manufacturer of gilt toys, for his invention of an improved method of manufacturing buttons for clothes.—Sealed 16th February—6 months for inrolment.

To Samuel Slocum, of the New-road, St. Pancras, in the county of Middlesex, engineer, for his invention of a certain improvement or improvements in machinery for making nails.—Sealed 18th February—6 months for inrolment.

To James Kay, of Pendleton, in the county of Lancaster, flax-spinner, for a heckling machine of a new

construction.—Sealed 24th February—6 months for inrolment.

To Richard Prosser, of Aston, near Birmingham, in the county of Warwick, civil-engineer, for certain improvements in making nails.—Sealed 25th February—6 months for inrolment.

To William Davis, of Leeds, in the county of York, engineer, for an improvement in machinery, for dressing of woollen or other cloths requiring such process.—Sealed 25th February—6 months for inrolment.

To William Newton, of the Office for Patents, Chancery-lane, in the county of Middlesex, civil-engineer, for certain improvements in preparing fibrous or textile plants, either indigenous or exotic, to be used in place of flax or hemp, being a communication from a foreigner abroad.—Sealed 25th February—6 months for inrolment.

To William Aitkin, of Aberdeen, in the county of Aberdeen, in North Britain, Esq., for certain improvements in the construction of carriages to be propelled by animal or other power.—Sealed 25th February—6 months for inrolment.

To Patrick Scyton Hynes, of Paddington, in the county of Middlesex, gentleman, for certain improvements in wheels, or axle-trees and boxes, and an apparatus for retarding or locking carriage-wheels.—Sealed 25th February—6 months for inrolment.

To James Aldons, of Clapton, in the county of Middlesex, smith, for certain improvements in steam-engines.—Sealed 25th February—6 months for inrolment.

NEWTON AND BERRY.

*Patent Agents,*
66, *Chancery Lane.*

## CELESTIAL PHENOMENA, FOR MARCH, 1835.

| D. | H. | M. | |
|---|---|---|---|
| 1 | | | Clock before the ☉ 12m. 42s. |
| | — | | ☽ rises 7 h. 59 m. M. |
| | — | | ☽ passes the mer. 1h. 47m. A. |
| | — | | ☽ sets 7 h. 46 m. A. |
| | 12 | | ♀ greatest elong. 46. 43. W. |
| 2 | 11 | 25 | ♃'s second sat. will em. |
| 3 | 14 | 12 | ☿ greatest Hel. Lat. N. |
| 4 | 5 | | ☽ in Apogee. |
| 5 | | | Clock before the ☉ 11m. 52s. |
| | — | | ☽ rises 8 h. 59 m. M. |
| | — | | ☽ passes the mer. 4h. 38m. A. |
| | — | | ☽ sets morn. |
| | 9 | 0 | ♃'s first sat. will em. |
| 6 | 3 | 25 | ♃ in conj. with the ☽ diff. of dec. 0. 14. N. |
| 7 | 4 | 12 | ☽ in □ or first quarter. |
| 8 | 20 | 8 | ♂ in conj. with the ☽ diff. of dec. 0. 50. N. |
| 10 | | | Clock before the ☉ 10m. 38s. |
| | | | ☽ rises 0 h. 7 m. A. |
| | | | ☽ passes the mer. 8h. 46m. A. |
| | | | ☽ sets 4 h. 31 m. M. |
| | 15 | 29 | ☿ inf. conj. with the ☉. |
| 12 | 10 | 56 | ♃'s first sat. will em. |
| 14 | 10 | 7 | Ecliptic oppo. or ● full moon. |
| | | | Occul ν in Virg. im. 5h. 24m., em. 6 h. 12 m. |
| 15 | | | Clock before the ☉ 9 m. 16 s. |
| | | | ☽ rises 6 h. 56 m. A. |
| | | | ☽ passes the mer. 0h. 22m. M. |
| | | | ☽ sets 6 h. 57 m. M. |
| 16 | 2 | | ☽ in Perigee. |
| | 6 | 4 | ♄ in conj. with the ☽ diff. of dec. 1. 13. S. |
| 17 | | | Mer. R. A. 22 h. 58 m. dec. 3. 50. S. |
| | | | Ven. R. A. 20 h. 49 m. dec. 16. 21. S. |
| | | | Mars R. A. 6 h. 45 m. dec. 25. 44. N. |
| | | | Vesta R. A. 4 h. 6 m. dec. 18. 43. N. |
| | | | Juno R. A. 23 h. 36 m. dec. 2. 48. S. |

| D. | H. | M. | |
|---|---|---|---|
| 17 | | | Pallas R. A. 17 h. 26 m. dec. 12. 11. N. |
| | — | | Ceres R. A. 17 h. 29 m. dec. 19. 25. S. |
| | — | | Jup. R. A. 4 h. 14 m. dec. 20. 46. N. |
| | — | | Sat. R. A. 13 h. 23 m. dec. 5. 47. S. |
| | — | | Georg. R. A. 22 h. 2 m. dec. 12. 46. S. |
| | — | | ☿ passes the mer. 23 h. 15 m. |
| | — | | ♀ passes the mer. 21 h. 13 m. |
| | — | | ♂ passes the mer. 6 h. 55 m. |
| | — | | ♃ passes the mer. 4 h. 36 m. |
| 18 | | | Occul. λ in Lib., im. 18 h. 32 m., em. 19 h. 38 m. |
| 20 | | | Clock before the ☉ 7 m. 47 s. |
| | — | | ☽ rises 0 h. 43 m. M. |
| | — | | ☽ passes the mer. 4h. 51m. M. |
| | — | | ☽ sets 8 h. 50 m. M. |
| | 8 | 18 | ♃'s second sat. will em. |
| | 19 | 56 | ☉ enters Aries, Spring commences. |
| 21 | 1 | 6 | ☽ in □ or last quarter. |
| | 7 | 21 | ♃'s first sat. will em. |
| 23 | 1 | 42 | ☿ stationary. |
| 24 | | | ♂ greatest Hel. Lat. N. |
| | 13 | 53 | ♀ in conj. with the ☽ diff. of dec. 5 37. N. |
| 25 | | | Clock before the ☉ 6m. 15s. |
| | — | | ☽ rises 5 h. 12 m. M. |
| | — | | ☽ passes the mer. 9h. 30m. M. |
| | — | | ☽ sets 1h. 58m. A. |
| | 9 | 32 | ♅ in conj. with the ☽ diff. of dec. 4. 28. N. |
| 26 | 0 | 56 | ☿ in conj. with the ☽ diff. of dec. 5. 38. N. |
| 27 | 2 | 26 | ☿ in the descending node. |
| 28 | 9 | 17 | ♃'s first sat. will em. |
| | 16 | 42 | Ecliptic conj. or new moon. |
| 31 | 19 | | ☽ in Apogee. |

**Venus is a Morning Star throughout the year.**

J. LEWTHWAITE, Rotherhithe.

# METEOROLOGICAL JOURNAL,

## FOR JANUARY AND FEBRUARY, 1835.

| 1835. | Thermo. | | Barometer. | | Rain in inches. | 1835. | Thermo. | | Barometer. | | Rain in inches. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hig. | Low. | High. | Low. | | | Hig. | Low. | High. | Low. | |
| Jan. | | | | | | Feb. | | | | | |
| 26 | 53 | 41 | 30,28 | 30,16 | | 11 | 41 | 24 | 30,30 | 30,24 | |
| 27 | 46 | 38 | 30,28 | 30,23 | | 12 | 47 | 37 | 30,13 | 30,08 | |
| 28 | 47 | 37 | 30,20 | 30,17 | | 13 | 49 | 37 | 30,03 | 29,89 | ,4 |
| 29 | 49 | 38 | 30,12 | 30,10 | | 14 | 48 | 37 | 29,80 | 29,71 | |
| 30 | 51 | 36 | 30,17 | 30,12 | | 15 | 50 | 38 | 29,60 | 29,50 | ,05 |
| 31 | 52 | 42 | 30,28 | 30,24 | | 16 | 48 | 39 | 29,52 | 29,44 | |
| Feb. | | | | | | 17 | 50 | 40 | 29,52 | Stay. | |
| 1 | 52 | 39 | 30,26 | 30,22 | | 18 | 50 | 33 | 29,46 | 29,44 | |
| 2 | 47 | 39 | 30,15 | 30,07 | ,075 | 19 | 43 | 29 | 29,40 | 29,37 | ,1 |
| 3 | 49 | 38 | 30,06 | 30,05 | | 20 | 47 | 37 | 29,28 | 29,25 | ,275 |
| 4 | 52 | 38 | 30,33 | 30,24 | | 21 | 45 | 30 | 29,34 | 29,16 | ,725 |
| 5 | 49 | 38 | 30.13 | 29,95 | | 22 | 48 | 39 | 29,30 | 29,20 | |
| 6 | 44 | 32 | 30,18 | 30,03 | ,075 | 23 | 51 | 35 | 29,34 | 29,17 | ,325 |
| 7 | 46 | 30 | 29,94 | 29,60 | ,025 | 24 | 46 | 32 | 29,62 | 29,48 | |
| 8 | 44 | 31 | 29,61 | 29,57 | | 25 | 49 | 33 | 29,66 | 29,46 | |
| 9 | 39 | 32 | 29,72 | 29.60 | ,025 | | | | | | |
| 10 | 40 | 29 | 30,14 | 30,02 | | | | | | | |

Lightning on the afternoon of the 21st, accompanied by two or three peals of rather loud and long-continued thunder, and a shower of small hail.

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 0 51 West of Greenwich.

# ALPHABETICAL INDEX

TO THE

# NAMES OF PATENTEES,

WITH THE

# TITLES OF THE PATENT INVENTIONS

REPORTED IN

## The Second Series

OF THE

# LONDON JOURNAL

OF

# ARTS AND SCIENCES,

COMPRISED IN NINE VOLUMES.

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To ADAMS, Thomas, of Oldbury, in the county of Salop, manufacturer, for his invention of certain improvements on instruments or apparatus for the relief or cure of hernia or rupture. Sealed 6th May, 1828.
No. 17, Vol. III, page 260.

— AITCHISON, John, of Clyde-buildings, in the city of Glasgow, and county of Lanark, merchant, for certain improvements in the concentrating and evaporating of cane juice, solutions of sugar, and other fluids. Sealed 15th September, 1829. No. 40, Vol. VII, page 220.

— AITKIN, William, of Curron-vale, in Scotland, Esq., for his having invented certain improvements in the means of keeping or preserving beer, ale, and other fermented liquors. Sealed 30th March, 1830.
No. 42, Vol. VII, page 343.

— ALCOCK, Thomas, and Blackwell, John, both of Claines, in the county of Worcester, machine makers and bobbin-net manufacturers, for their having invented certain improvements in machines or machinery for making lace, commonly called bobbin-net. Sealed 13th January, 1831.
No. 44, Vol. VIII, page 177.

— ANDREWS, Frederick, of Stamford Rivers, in the county of Essex, Gentleman, for his invention of certain improvements in the construction of carriages, and in the engines or machinery to propel the same, to be operated upon by steam or other suitable power; which machinery are also applicable to other purposes. Sealed 20th December, 1826.
No. 12, Vol. II, page 331.

— APPLEGARTH, Augustus, of Crayford, Kent, printer, for improvements in block-printing. Sealed 26th January, 1828.
No. 19, Vol. IV, page 40.

— APSEY, Joseph, of John-street, Waterloo-road, in the parish of St. Mary, Lambeth, engineer, for his invention of an improvement in machinery, to be used as a substitute for a crank. Sealed 27th November, 1827. No. 20, Vol. IV, page 82.

To ARNOLD, Thomas, of Hoxton, Middlesex, tin-plate worker, for his invention of an improved gauge for denoting the quality or strength of certain fluids or spirituous liquors, and for denoting the quantity of fluid or spirituous liquors withdrawn from the vessel or receptacle in which the same are contained, and which machine or gauge may be so constructed as to effect either of the above objects without the other, if required. Sealed 26th May, 1829. No. 51, Vol. IX, page 177.

— ASPINWALL, Thomas, of Bishopsgate-churchyard, in the city of London, Esq., in consequence of a communication made to him by a foreigner residing abroad, for an improved method of casting printing types, by means of a mechanical process, which he proposes to call the mechanical type-caster. Sealed 22d May, 1828.
No. 28, Vol. V, page 212.

— ATHERLY, Edmond Gibson, of York-place, Portman-square, in the county of Middlesex, Esq., for his having invented or found out an apparatus for a method of generating power applicable to various purposes. Sealed 12th June, 1828. No. 18, Vol. III, page 301.

— ATLEE, James Falconer, of Prospect-place, Deptford, Kent, Gentleman, for his invention of certain improvements on bands or hoops for securing made and other masts, bowsprits, and yards, and applicable to other purposes. Sealed 15th January, 1828. No. 37, Vol. VII, page 28.

————————————, of Prospect-place, Deptford, Kent, Gentleman, and Ferguson, Charles Augustus, of Mill-wall, in the parish of All Saints, Poplar, Middlesex, mast-makers, for their invention of certain improvements in the construction of made masts. Sealed 22d December, 1827.
No. 37, Vol. VII, page 26.

— BACON, Hugh Ford, of Leeds, in the county of York, Gentleman, and Rev. Thomas Kilby, of Wakefield, in the same county, clerk, for their having invented or found out a new or improved gas lamp or burner. Sealed 2d July, 1829. No. 25, Vol. V, page 22.

— BAILY, Thomas, of Leicester, frame-smith, for his having invented certain improvements in machinery for making lace. Sealed 5th August, 1829. No. 34, Vol. VI, page 177.

————————————, of Leicester, and Bailey, Charles, of the same place, frame-smith, for their having invented certain improvements in machinery for making bobbin-net lace. Sealed 15th February, 1831.
No. 46, Vol. VIII, page 193.

— BAKEWELL, Samuel Roscoe, of Whiskin street, in the parish of St. James's, Clerkenwell, Middlesex, brick and stone-ware manufacturer, in consequence of communications from foreigners abroad, and subsequent improvements by himself, for an invention of certain improvements in machinery for the manufacture of bricks, tiles, &c., parts of which are applicable to other purposes. Sealed 18th August, 1830.
No. 45, Vol. VIII, page 113.

— BANKS, Thomas, of Patricroft-within, Barton-upon-Irwell, in the county palatine of Lancaster, civil engineer, for his improvements in steam-engines. Sealed 30th September, 1829. No. 26, Vol. V, page 69.

— BARING, John, of Bread-street-buildings, in the city of London, merchant, in consequence of a communication by a foreigner abroad, for an invention of a new and improved mode of manufacturing machines for cutting fur from skins for the use of hatters, to be called "Cant Twist Blades Fur Cutters." Sealed 3d July, 1828. No. 13, Vol. III, page 34.

— BARLOW, Robert, of Jubilee-place, Chelsea, in the county of Middlesex, Esq., for his having invented a new combination of machinery or new motion for superseding the necessity of the ordinary crank in steam-

engines, and for other purposes where power is required. Sealed 1st February, 1827. No. 8, Vol. II, page 62.

To BARNARD, Edward, of Nailsworth, near Minchinhampton, in the county of Gloucester, clothier, for certain improvements in weaving and preparing cloth. Sealed 19th August, 1828. No. 50, Vol. IX, page 107.

— BARRON, James, of Birmingham, in the county of Warwick, brass-founder and Venetian-blind maker, for his invention of a combination of machinery or apparatus for feeding fire with fuel, applicable to other purposes. Sealed 24th July, 1826. No. 2, Vol. I, page 100.

— BARTHOLOMEW, Valentine, of Great Marlborough-street, Westminster, in the county of Middlesex, Gentleman, for his invention of improvements in shades for lamps and other lights. Sealed 21st December, 1826. No. 2, Vol. I, page 93.

— BARTLETT, John, of Chard, in the county of Somerset, shoe-thread-manufacturer, for his invention of new and improved methods of manufacturing process for preparing flax, thread, or yarn, for use in the manufacture of boots, shoes, saddlery, and of sails, sail-cloths and bagging. Sealed 16th June, 1828. No. 32, Vol. VI, page 94.

— BATES, Joshua, of Bishopsgate-street Within, in the city of London, merchant, in consequence of a communication by a foreigner abroad, being in the possession of a new process or method of whitening sugars. Sealed 1st August, 1829. No. 29, Vol. V, page 259.

— BAYLIFFE, Edward, of Kendal, in the county of Westmoreland, worsted-spinner (being one of the people called Quakers), for his invention of certain improvements in the machinery used for the operations of drawing, roving, and spinning of sheep and lambs' wool. Sealed 14th July, 1826. No. 3, Vol. I, page 151.

— BEALE, Joshua Taylor, of Church-lane, Whitechapel, Middlesex, engineer, and Porter, George Richardson, of Old Broad-street, in the city of London, merchant, for their new invented mode of communicating heat for various purposes. Sealed 19th January, 1828. No. 6, Vol. I, page 342.

— BELL, William, of Lucas street, Commercial-road, in the county of Middlesex, Gentleman, for his having invented improved methods of filtrating water, and other liquors. Sealed 4th September, 1828. No. 38, Vol. VII, page 88.

— ——, Alexander, of Chapel-place, in the borough of Southwark, engineer, for his having invented certain improvements in machinery for removing wool or hair from skins. Sealed 4th November, 1830. No. 44, Vol. VIII, page 64.

— BENECKE, William, of Deptford, Kent, Gentleman, in consequence of a communication made to him by a foreigner residing abroad, for an invention of a machine for grinding or crushing seeds, &c., for the purpose of extracting oil therefrom. Sealed 20th February, 1827. No. 12, Vol. II, page 337.

— BENTLEY, David, of Eccles, in the county of Lancaster, bleacher, for his invention of an improved carriage-wheel. Sealed 8th May, 1827. No. 14, Vol. III, page 104.

— ——————, of Pendleton, in the county of Lancaster, bleacher, for his having invented an improved method of bleaching and finishing linen or cotton yarns and goods. Sealed 21st February, 1828. No. 41, Vol. VII, page 285.

— BERNHARD, Anton, of Finsbury-square, in the county of Middlesex, engineer, for a method, principle, or apparatus, for raising water or other fluids. Sealed 24th July, 1828. No. 16, Vol. III, page 176.

To BERNHARD, Anton, of Finsbury-circus, in the county of Middlesex, engineer, for his having invented certain improvements on, or additions to, wheels on apparatus for propelling vessels, and other purposes. Sealed 15th December, 1828. No. 16, Vol. III, page 198.

— BEROLLAS, Joseph Anthony, of Great Waterloo-street, in the parish of Lambeth, in the county of Surrey, watch-maker, for his invention of a detached alarum watch. Sealed 28th April, 1827. No. 8, Vol. II, page 84.

————————, of Nelson-street, City-road, in the parish of St. Luke, Middlesex, watch manufacturer, for his having invented or found out a method of winding a watch or clock without a key, which he calls Berollas's Keyless Watch or Clock; and also certain improvements to be applied to his late invented detached alarum watch. Sealed 13th December, 1827. No. 20, Vol. IV, page 78.

— BERRY, Miles, of the Office for Patents, Chancery-lane, in the parish of St. Andrew, Holborn, Middlesex, engineer, and mechanical draftsman, in consequence of a communication by a foreigner abroad, for an invention of certain improvements in the boilers or generators of steam and other vapour, and in engines to be worked by steam or vapour for propelling or actuating machinery on land, and boats, vessels, or other floating bodies on water, and also in the mode of condensing such steam or vapour. Sealed 28th September, 1831. No. 49, Vol. IX, page 10.

— BLACKWELL, John, and Alcock, Thomas, both of Claines, in the county of Worcester, machine-makers and bobbin-net manufacturers, for their having invented or found out certain improvements in machinery for making bobbin-net-lace. Sealed 13th January, 1831. No. 46, Vol. VIII, page 177.

— BLADES, Joseph, of Clapham, in the county of Surrey, Gent., in consequence of a communication by certain foreigners residing abroad, for a new invented improvement in the water-proof stiffening for hats. Sealed 15th January, 1828. No. 8, Vol. II, page 95.

— BLUETT, James, of Blackwall, in the county of Middlesex, ship-joiner, mast, clock, and pump maker, and Parr, William, of Union-place, City-road, in the same county, Gentlemen, for their having invented a new method of producing a reciprocating action by means of rotatory motion to be applied to the working of pumps, and other machinery in or to which reciprocating action is required or may be applied. Sealed 22d December, 1828. No. 21, Vol. IV, page 131.

— BLUNDELL, Henry, of Kingston-upon-Hull, York, merchant, for improvements in a machine for grinding or crushing seeds, &c., for abstracting oil therefrom, and which is applicable to other purposes. Sealed 6th December, 1830. No. 40, Vol. VII, page 236.

— BOASE, John, of Albany-street, Gent., and Smith, Thomas, mechanic, of Augustus-street, both in the Regent's-park, in the county of Middlesex, for certain improvements in machines for scraping, sweeping, cleaning, and watering streets, roads, &c., which may be applied to other purposes. Sealed 10th December, 1828. No. 50, Vol. IX, page 67.

— BOCK, Henry, of Ludgate-street, in the city of London, Esq., in consequence of a communication by a foreigner abroad, for improvements on machinery for embroidering cloths, stuffs, or other fabrics. Sealed 2d May, 1829. No. 52, Vol. IX, page 192.

— BOMPAS, Charles Carpenter, of the Inner Temple, Esq., for improvements in propelling locomotive carriages, machines, boats, and other vessels. Sealed 29th April, 1828. No. 11, Vol. II, page 278.

To BONNER, Thomas, of Monkwearmouthshore, Durham, merchant, for certain improvements on safety lamps. Sealed 4th December, 1827.
No. 19, Vol. IV, page 23.

— BOTFIELD, Thomas, of Hopton Court, in the county of Salop, coal and iron master, for certain improvements in making iron, or in the method of smelting and making of iron. Sealed 2d January, 1828.
No. 38, Vol. VII, page 65.

— BOWLER, John, of Castle-street, Southwark, in the county of Surrey, hat-manufacturer, for his having invented certain improvements in machinery employed in the process of dyeing hats. Sealed 4th November, 1830 No. 44, Vol. VIII, page 81.

— BRAITHWAITE, John, and Ericsson, John, of the New-road, Fitzroy-square, in the county of Middlesex, engineers, for their new invented method of converting liquids into vapour or steam. Sealed 31st Jan. 1829.
No. 22, Vol. IV, page 188.

———————————, of the New-road, in the county of Middlesex, engineers, for their invention of an improved method of manufacturing salt. Sealed 27th February, 1830.
No. 35, Vol. VI, page 249.

— BRANDRETH, Thomas Shaw, of Liverpool, in the county of Lancaster, barrister-at.luw, for a new method of applying animal power to machinery. Sealed 9th September, 1829. No. 52, Vol. IX, page 187.

— BREIDENBACK, Thomas, of Birmingham, in the county of Warwick, merchant, for his invention of certain improvements on bedsteads, and in making or forming articles to be applied thereto from materials hitherto unused for such purposes. Sealed 13th August, 1827.
No. 9, Vol. II, page 159.

———————————, of Birmingham, in the county of Warwick, merchant, for a machine or improved mode by the use of machinery of manufacturing tubes or rods, and for other purposes. Sealed 26th April, 1828. No. 37, Vol. VII, page 30.

— BROADWOOD, James Shudi, of Great Pulteney-street, Golden-square, in the parish of St. James, Westminster, Middlesex, pianoforte-maker, for his invention of certain improvements in the grand pianoforte. Sealed 9th April, 1827. No. 21, Vol. IV, page 132.

— BROOK, Charles, of Meltham Mills, near Huddersfield, York, cotton spinner, for his invention of certain improvements in machinery for spinning cotton, &c. Sealed 4th June, 1829. No. 30, Vol. V, page 328.

— BROOK, Barnard Henry, of Huddersfield, York, civil engineer, for his new-invented improvements in the construction and setting of ovens and retorts for carbonising coal for the use of gas-works. Sealed 6th March, 1828. No. 42, Vol. VII, page 338.

— BROOKING, Samuel, Esq., of Plymouth, in the county of Devon, a rear-admiral in the royal navy, for his having invented a certain turning or slipping fid, for securing and releasing the upper masts of ships and vessels. Sealed 6th May, 1828. No. 29, Vol. V, page 264.

———————————, Esq., of Plymouth, Devon, a rear-admiral in the royal navy, for his invention of a new method or mode of making sails of ships and other vessels. Sealed 4th September, 1828.
No. 38, Vol. VII., page 85.

— BROWN, John, and Champion, William Dudderidge, of Bridgewater, in the county of Somerset, merchants and co-partners, for their having discovered a certain composition or substance, which may be manufactured or moulded either into bricks, or into blocks of any form, for building, and also manufactured and moulded to, and made applicable

for, all internal and external ornamental architectural purposes, and for various other purposes. Sealed 5th May, 1827.
No. 9, Vol. II, page 157.

To BROWN, Isaac, of Gloucester-street, Clerkenwell, in the county of Middlesex, watch-maker, for certain improvements applicable to watches, and other horological machines. Sealed 23d September, 1829.
No. 23, Vol. IV, page 264.

————, Samuel, of Billiter-square, in the city of London, commander in the Royal Navy, for his invention of certain improvements in making or manufacturing bolts or chains. Sealed 24th April, 1830.
No. 42, Vol. VII, page 321.

—, Thomas, of Birmingham, in the county of Warwick, coach-maker, for his having invented an improved coach, particularly adapted for public conveyance and luggage. Sealed August 5, 1829.
No. 51, Vol. IX, page 164.

— BROWNILL, Jonathan, of Sheffield, in the county of York, cutler, for an improved method of transferring vessels from a higher to a lower level, or from a lower to a higher level, on canals, and also for the more conveniently raising or lowering weights, carriages, or goods on rail-roads, and for other purposes. Sealed 1st May, 1828.
No. 38, Vol. VII, page 78.

————, Jonathan, of Sheffield, in the county of York, cutler, Rodgers, George, of the same place, cutler, and Hobson, Jonathan Cripps, of the same place, merchant, for their having invented certain improvements on table-forks. Sealed 23d December, 1828.
No. 13, Vol. III, page 42.

— BRUNTON, William, of Leadenhall-street, in the city of London, civil engineer, for his invention of a machine, apparatus or instrument, to ascertain and register the quantity of specific gravity and temperature of certain fluids in transit, parts of which invention are applicable to other purposes. Sealed 4th December, 1828. No. 18, Vol. III, page 293.

————, William, of Leadenhall-street, in the city of London, civil engineer, for his having invented certain improvements on furnaces, for the calcination and sublimation or evaporation of ores, metals, and other substances. Sealed 21st Feb., 1828. No. 18, Vol. III, page 320.

—, John, of West Bromwich, in the county of Stafford, engineer, for improvements in the apparatus for manufacturing coal, gas, and coke, and also improvements in the method of arranging such apparatus. Sealed 2d October, 1828. No. 27, Vol. V, page 140.

— BUDDING, Edwin, of the Thrupp, in the parish of Stroud, in the county of Gloucester, machinist, for his having invented a new combination and application of machinery, for the purpose of cropping or shearing the vegetable surfaces of lawns, or grass plats of pleasure-grounds, constituting a machine which may be used with advantage, instead of a scythe for that purpose. Sealed 31st August, 1830.
No. 34, Vol. VI, page 196.

— BULKELEY, Thomas, of Richmond, in the county of Surrey, doctor of physic, for his invention of a method of making or manufacturing candles. Sealed 26th January, 1830. No. 39, Vol. VII, page 134.

— BUNDY, William, of Kentish-town, in the county of Middlesex, machinist, and Molineux, Francis, of Hampstead, in the same county, Gentlemen, for their invention of improvements in machinery, for spinning and twisting silk and wool, and for roving, spinning, and twisting cotton, flax, hemp, and other fibrous substances. Sealed 21st September, 1830.
No. 44, Vol. VIII, page 49.

To BURGES, George, of Bagnigge-wells, in the county of Middlesex, Gentleman, for his invention of certain improvements in the construction of wheeled-carriages, and wheels to be attached to the said carriages, or for other purposes. Sealed 26th May, 1827. No. 5, Vol. I, page 286.

— BURGIS, John, of Maiden-lane, in the parish of St. Paul, Covent-garden, Middlesex, ornamental paper-manufacturer, for his new-invented method of gilding or silvering certain woven fabrics in burnished, or burnished and dead, or melted gold and silver, and which said fabrics may be used as gold or silver, and lace borderings, and for other purposes. Sealed 5th February, 1829. No. 46, Vol. VIII, page 183.

— BURSTALL, Timothy, of Leith, Scotland, and Hill, John, of Bath, engineers, for their invention of certain improvements in machinery, for propelling locomotive-carriages. Sealed 22d August, 1826. No. 12, Vol. I, page 330.

— BURT, Peter, of Waterloo-place, in the parish of St. Ann, Limehouse, in the county of Middlesex, mathematical instrument maker, in consequence of a communication from a foreigner abroad, for an invention of an improved steam-engine. Sealed 4th August, 1827. No. 36, Vol. VI, page 332.

— BUSH, Matthew, of Dalmonach Printfield, near Bonhill, by Dumbarton, North Britain, calico-printer, for his invention of certain improvements in machinery or apparatus for printing calico and other fabrics. Sealed 27th March, 1827. No. 31, Vol. VI, page 16.

— BUSK, William, of Broad-street, in the city of London, Esq., for his invention of certain improvements in propelling boats and ships, or other vessels, or floating bodies. Sealed 18th October, 1826. No. 7, Vol. II, page 21.

———, Robert, and Westly, William King, of Leeds, York, flax-spinners, for their invention of certain improvements in machinery, for heckling or dressing, and for breaking, scutching, or cleansing hemp, flax, or other fibrous substances. Sealed 29th August, 1826. No. 10, Vol. II, page 199.

— CANEY, John Hopper, of Aylesbury-street, Clerkenwell, Middlesex, for certain improvements in umbrellas and parasols. Sealed 21st January, 1829. No. 13, Vol. III, page 37.

— CARPENTER, James, and Young, John, both of Willenhall, Wolverhampton, county of Stafford, locksmiths, for their having invented certain improvements on locks and other securities applicable to doors, &c. Sealed 18th January, 1830. No. 39, Vol. VII, page 152.

— CARTER, Elias, of Exeter, in the county of Devon, upholsterer, for a new covering for the roofs of houses and other buildings. Sealed 11th October, 1827. No. 24, Vol. IV, page 336.

— CHAMPION, William Dudderidge, and Brown, John, of Bridgewater, in the county of Somerset, merchants and co-partners, for their having discovered a certain composition or substance which may be manufactured either into bricks or blocks of any form for building, and also made applicable for all internal and external ornamental architectural purposes, and for various other purposes. Sealed 5th May, 1827. No. 9, Vol. II, page 187.

— CHAPMAN, William, of the town and county of Newcastle-upon-Tyne, civil engineer, for his invention of a certain improvement or improvements in waggons that have to travel on railways or tramways. Sealed 14th August, 1827. No. 36, Vol. VI, page 324.

— CHARLESWORTH, Joseph, and Charlesworth, Joshua, of Holmfirth, woollen manufacturers and merchants, and Mellor, Samuel, of the same

place, cloth-dresser, all in the county of York, for their having invented certain improvements on, or additions to, gig-mills, for the raising and finishing of woollen-cloths and other fabrics. Sealed 18th December, 1828. No. 43, Vol. VIII, page 24.

To CHESTERMAN, James, of Sheffield, in the county of York, mechanic, for his having invented certain improvements on machines or apparatus for measuring land and other purposes. Sealed 14th July, 1829. No. 42, Vol. VII, page 339.

— CHRIST, John George, of the Old City Chambers, Bishopsgate-street Within, in the city of London, Gentleman, in consequence of a communication made to him by a certain foreigner residing abroad, for certain improvements in copper and other plate printing. Sealed 14th February, 1827. No. 4, Vol. I, page 229.

— CHUBB, Charles, of St. Paul's Church-yard, in the city of London, patent lock manufacturer, for certain improvements in the construction of latches, which may be used for fastening doors or gates. Sealed 17th May, 1828. No. 22, Vol. IV, page 204.

— CHURCH, William, of Birmingham, in the county of Warwick, Esq., for his invention of certain improvements in apparatus for spinning fibrous substances. Sealed 13th July, 1827. No. 6, Vol. I, page 332.

———————, of Birmingham, in the county of Warwick, Esq., for his invention of certain improvements in printing. Sealed 18th October, 1826. No. 3, Vol. I, page 144.

—, of Birmingham, in the county of Warwick, Gent., for his invention of certain improvements in buttons, and in the machinery for manufacturing the same. Sealed 26th March, 1829. No. 29, Vol. V, page 249.

, of Heywood-house, near Birmingham, in the county of Warwick, Esq., for certain improvements in and upon instruments for sharpening knives and other edge tools, and in the machinery or apparatus for manufacturing the same. Sealed 15th October, 1829. No. 27, Vol. V, page 138.

———————, of Heywood-house, near Birmingham, in the county of Warwick, Esq., for certain improvements in machines for propelling vessels and other machines capable of being propelled by steam, and in boilers applicable to the same, and also to other purposes. Sealed 15th October, 1829. No. 40, Vol. VII, page 207.

——————— of Heywood-house, Bordsley-green, in the county of Warwick, Gentleman, for his invention of certain improvements in the construction of boats and other vessels, a part of which improvements are applicable to the construction of carriages. Sealed 21st September, 1830. No. 41, Vol. VII, page 270.

———————, of Heywood-house, Bordsley-green, near Birmingham, in the county of Warwick, Esq., for his having invented certain improvements in apparatus applicable to propelling boats and driving machinery by the agency of steam, parts whereof are also applicable to the purposes of evaporation. Sealed 29th November, 1830. No. 43, Vol. VIII, page 1.

— CLARK, John Were, of Tiverton, in the county of Devon, for his invention of an improved mode of attaching, fixing, or securing the dead eyes to the channels and sides of ships or vessels. Sealed 8th June, 1827. No. 12, Vol. II, page 339.

— CLARK, Matthew, of the island of Jamaica, engineer, and Fawcett, William, of Liverpool, in the county of Lancaster, engineer, for their inven

tion of an improved apparatus for the better crystallisation of sugar from the canes. Sealed 4th December, 1827. No. 32, Vol. VI, page 92.

To CLARK, William and Benjamin, cloth-dressers, and Foxwell, Philip, clothier, all of Dye-house Mill, in the parish of Minchinhampton, in the county of Gloucester, for certain improvements in machinery for shearing, cropping, or cutting and finishing, woollen and other cloths and cassimeres. Sealed 19th August, 1828. No. 50, Vol. IX, page 106.

— CLARKE, Thomas, of Market Harborough, in the county of Leicester, carpet and worsted manufacturer, for his invention of certain improvements in manufacturing carpets. Sealed 26th May, 1827.
No. 32, Vol. VI, page 86.

— CLAYTON, Edwin, of Bridlesmith Gate, in the town and county of the town of Nottingham, baker, for his invention of an improved mode of manufacturing dough or paste for the purpose of baking into bread. Sealed 31st August, 1830. No. 42, Vol. VII, page 320.

— CLEGG, Samuel, of Chapel-walk, Liverpool, civil engineer, for his invention of certain improvements in steam-engines, boilers, and generators. Sealed 20th March, 1828. No. 7, Vol. II, page 8.

— CLELAND, William, of Pentonville, Middlesex, Gentleman, for his improvements in evaporations. Sealed 24th July, 1826.
No. 3, Vol. I, page 162.

———————————— of the city of Glasgow, Gentleman, for his invention of certain improvements in the process of preparing, refining, and evaporating sugar. Sealed 4th July, 1827. No. 6, Vol. I, page 359.

— CLUTTERBUCK, William, of Ozlebrook, near Stroud, in the county of Gloucester, shear-maker, for his having invented certain improvements in the shears used for cutting or cropping of woollen cloths, and other fabrics requiring shearing. Sealed 21st November, 1829.
No. 27, Vol. V, page 132.

— CLYMER, George, of Finsbury-place, Middlesex, engineer, for his invention of an improvement in typographic printing between plain or flat surfaces. Sealed 6th September, 1827. No. 4, Vol. I, page 218.

— COBB, Thomas, of Calthorpe House, near Banbury, Oxford, Esq., for his invention of certain improvements in the manufacture of paper intended to be applied to the covering of walls or the hanging of rooms, and in the apparatus for effecting the same. Sealed 15th September, 1829.
No. 35, Vol. VI, page 253.

— COCHRANE, William Erskine, of Regent-street, in the county of Middlesex, Esq., for his new invented improvements in apparatus for cooking and other purposes. Sealed 15th January, 1828.
No. 41, Vol. VII, page 283.

———————————— of Regent-street, county of Middlesex, for his having invented an improvement in or on paddles, for propelling boats and other vessels. Sealed 14th January, 1829.
No. 51, Vol. IX, page 156.

———————————, Sir Thomas, Knight, and Galloway, Alexander, engineer, for the working or making a manufacture, being a machine for removing the inconvenience of smoke or gases generated in stoves, &c., by the ignition of coals, &c., and in certain cases for directing the heat, and applying such smoke or gases to various useful purposes. Sealed 4th May, 1818.
No. 30, Vol. V, page 340.

— COFFEY, Æneas, of the Dock Distillery, Dublin, distiller, for certain

improvements in the process, or machinery used in the process of brewing and distilling. Sealed 5th August, 1830. No. 42, Vol. VII, page 328.

To COGGIN, Thomas Patrick, of Wadworth, near Doncaster, York, machine-maker, for his having invented a new or improved machine for dibbling grain of every description. Sealed 19th May, 1827.
No. 8, Vol. II, page 88.

— COLES, Charles Boswell, late of Duke-street, Manchester square, in the county of Middlesex, Esq., and Nicholson, William, of Manchester, in the county of Lancaster, civil engineer, in consequence of a communication from a certain person abroad, for a new method of constructing gasometers or machines, or apparatus for holding and distributing gas for illumination. Sealed 20th February, 1827. No. 15, Vol. III, page 152.

— COLLIER, William, of Salford, in the county of Lancaster, fustian-shearer, in consequence of certain communications made to him by a foreigner residing abroad, for certain improvements in the power-loom for weaving. Sealed 10th November, 1827. No. 38, Vol. VII, page 70.

————, James, of Newman-street, Oxford-street, in the county of Middlesex, civil engineer, and Pinkus, Henry, of Thayer-street, Manchester-square, Middlesex, Gentleman, for their invention of an improved method, and apparatus for generating gas for illumination. Sealed 5th April, 1830. No. 33, Vol. VI, page 132.

— COMBS, Benjamin Merriman, of Birmingham, Warwick, for his invention of improvements in or additions to a pulley machinery, and apparatus used and applied for securing, fixing, and moving curtains and rollers and other blinds. Sealed 30th August, 1827. No. 36, Vol. VI, page 328.

— CONGREVE, Sir William, of Cecil-street, Strand, Middlesex, Bart., for his having invented a new motive power. Sealed 8th February, 1827.
No. 11, Vol. II, page 287.

— COOK, Benjamin, of Birmingham, in the county of Warwick, brass-founder for his having invented an improved method of making rollers or cylinders of copper and other metal, or a mixture of metals, for the purpose of printing calicoes, silks, cloths, and other articles. Sealed 23d April, 1829. No. 21, Vol. IV, page 133.

— COSTIGAN, John, of Collon, in the county of Louth, in the kingdom of Ireland, civil engineer, for his invention of certain improvements in steam machinery or apparatus. Sealed 13th December, 1826.
No. 19, Vol. II, page 142.

— COWDEROY, John, of Britannia-street, City-road, Middlesex, Gent., for his having invented certain improvements in machinery for making bricks. Sealed 2d November, 1829. No. 52, Vol. IX, page 221.

— COWPER, Edward, of Clapham-road-place, in the county of Surrey, Gent., for his invention of certain improvements in printing music. Sealed 5th April, 1827. No. 17, Vol. III, page 230.

———————— of Clapham-road-place, in the parish of St. Mary, Lambeth, in the county of Surrey, Gentleman, for certain improvements in cutting paper. Sealed 26th March, 1828.
No. 43, Vol. VIII, page 20.

— CRABTREE, Robert, of Halesworth, in the county of Suffolk, Gent., for his invention of a machine or apparatus for propelling carriages, vessels, and locomotive bodies. Sealed 4th July, 1829.
No. 35, Vol. VI, page 246.

— CROMPTON, Thomas Bonsor, of Tamworth, in the county of Lancaster, paper-maker, and Taylor, Enoch, of Marsden, in the county of York, mill-

wright, for their invention of certain improvements in that part of the process of paper-making which relates to the cutting. Sealed 13th May, 1828. No. 23, Vol. IV, page 284.

To CROSLEY, Samuel, of Cottage-lane, City-road, Middlesex, gas apparatus manufacturer, and Parkinson, William, of Barton-upon-Humber, in the county of Lincoln, Gentleman, for their improved method of constructing and working an engine for producing power and motion. Sealed 1st August, 1827. No. 5, Vol. I, page 299.

— CRUNDWELL, John, of Ashford, and Lawrence, David, of Stroud, both in the county of Kent, gun-makers, for certain improvements in apparatus to be applied to fowling-pieces and other fire-arms, in place of locks. Sealed 15th September, 1829. No. 52, Vol. IX, page 206.

— CUMMEROW, Charles, of Lawrence Pountney-lane, Cannon-street, in the city of London, merchant, in consequence of a communication made to him by a certain foreigner abroad, for certain improvements in propelling vessels. Sealed 10th December, 1828.
No. 45, Vol. VIII, page 144.

— CURRIE, Donald, of Regent-street, St. James's, in the county of Middlesex, for his method of preserving grain and other vegetable and animal substances and liquids. Sealed 31st January, 1828.
No. 21, Vol. IV, page 141.

— DAKEYNE, Edward, and Dakeyne, James, both of Darley Dale, in the county of Derby, merchants, for their having invented a machine or hydraulic engine, for applying the power or pressure of water, steam and other elastic fluids to the purpose of working machinery, and other uses requiring power, and applicable to that of raising or forcing fluid. Sealed 21st January, 1830. No. 49, Vol. XI, page 19.

— DALGLISH, Robert, jun., of Glasgow, calico-printer, for his invention of improvements in machinery or apparatus for printing calicoes and other fabrics. Sealed 6th December, 1830. No. 42, Vol. VII, page 324.

— DANIEL, John Frederick, Esq., of Gower-street, Bedford-square, Middlesex, for his having invented improvements in the manufacture of gas. Sealed 1st February, 1827. No. 12, Vol. II, page 319.

— DANIELL, Joseph Clisild, of Limpley, in the parish of Bradford, in the county of Wilts, clothier, for his having invented certain improvements in the machinery used for dressing woollen cloths. Sealed 18th September, 1828. No. 24, Vol. IV, page 333.

————————, of Limpley Stoke, in the parish of Bradford, in the county of Wilts, clothier, for his invention of certain improvements in machinery, applicable to the dressing of woollen cloth. Sealed 26th May, 1829. No. 24, Vol. IV, page 334.

————————, of Stoke, in the county of Wilts, clothier, for his invention of certain improvements in preparing wire cards for dressing woollen and other cloths. Sealed 8th June, 1827.
No. 4, Vol. I, page 227.

————————, of Stoke, in the county of Wilts, clothier, for his invention of certain improvements in dressing cloths, and in machinery applicable for that purpose. Sealed 2d January, 1828.
No. 6, Vol. I, page 344.

of Stoke, in the county of Wilts, clothier, for certain improvements applicable to the manufacturing and preparing woollen cloths. Sealed 5th August, 1828. No. 46, Vol. VIII, page 198.

of Stoke, in the county of Wilts, clothier,

for certain improvements in machinery applicable to dressing woollen cloth. Sealed 8th July, 1829. No. 51, Vol. IX, page 167.

To DANINOS, Alexander, of Leman-street, Goodman's-fields, in the county of Middlesex, for a certain invention for the manufacture of improved hats and bonnets, in imitation of Leghorn straw hats and bonnets, which invention was communicated to him by a foreigner residing abroad. Sealed 5th February, 1829. No. 40, Vol. VII, page 234.

— D'ARCY, Joseph, of Leicester-square, Middlesex, Esq., sole executor of Charles Broderip, late of Spring-gardens, Middlesex, Esq., deceased, for certain improvements in steam-engines, and the apparatus connected therewith. Sealed 29th November, 1828. No. 34, Vol. VI, page 201.

— DAVIS, John, of Leman-street, Goodman's-fields, Middlesex, sugar-refiner, for an improvement in boiling or evaporating solutions of sugar and other liquors. Sealed 29th March, 1828. No. 26, Vol. V, page 79.

————————, of Leman-street, in the county of Middlesex, sugar-refiner, in consequence of a communication by a foreigner abroad, for a certain improvement in the condenser used with the said John Davis's apparatus for boiling sugar in vacuo, for which a patent was granted to him the 29th March, 1828. Sealed 28th April, 1829. No. 26, Vol. V, page 83.

————, Samson, of East Smithfield, Middlesex, gun-lock-maker, and Lacy, John George, of Camomile-street, in the city of London, gun-manufacturer, for certain improvements in guns and fire-arms. Sealed 6th December, 1830. No. 44, Vol. VIII, page 83.

— DAWS, Robert, of Margaret-street, Cavendish-square, Middlesex, upholsterer, for certain improvements on chairs or machines, calculated to increase ease and comfort. Sealed 28th April, 1827. No. 2, Vol. I, page 88.

— DAY, William, of the Strand, Middlesex, trunk and camp equipage maker, for certain improvements on bedsteads, which are also applicable to other purposes. Sealed 31st August, 1826. No. 12, Vol. II, page 329.

————, Benjamin Ager, of Birmingham, in the county of Warwick, manufacturer for improvements in the manufacture of picture-frames, in various ways, forms, and sizes. Sealed 28th August, 1828. No. 29, Vol. V, page 275.

————, Francis, of the Poultry, in the city of London, optician, and Munch, Auguste, of the same place, mechanic, in consequence of a communication from a foreigner abroad, and improvements by themselves, for an invention of certain improvements on musical instruments. Sealed 19th June, 1829. No. 52, Vol. IX, page 197.

— DEAKIN, James, and Deakin, Thomas, of Sheffield, York, merchants and manufacturers of hardware, and co-partners for certain methods of making from horns and hoofs of animals various articles; namely, handles and knobs of drawers, and other parts of cabinet and household articles, curtain rings, bell pulls, door handles, and knobs, &c., of any shape or device, plain or ornamental, or inlaid or conjoined with any kind of metal or other material. Sealed 14th January, 1829. No. 36, Vol. VI, page 339.

—DE BERENGER, Baron Charles Random, of Target Cottage, Kentish Town, Middlesex, for certain improvements in gunpowder flasks, powder horns, &c., for carrying gunpowder, in order to load therefrom guns, pistols, and other fire-arms. Sealed 20th December, 1826. No. 7, Vol. II, page 19.

To DEBTMER, William, of Upper Marylebone-street, Fitzroy square, Middlesex, pianoforte-maker, for his invention of certain improvements on pianofortes. Sealed 30th August, 1827. No. 36, Vol. VI, page 329.

— DEEBLE, Edward Barnard, of St. James's-street, Westminster, in the county of Middlesex, civil engineer, for his invention of a new construction and combination of metallic blocks for the purpose of forming caissons, jetties, piers, quays, embankments, light-houses, foundations, walls, or such other erections, to which the said metallic blocks may be applied. Sealed 12th July, 1827. No. 10, Vol. II, page 203.

— DE JONGH, Maurice, of Warrington, in the county palatine of Lancaster, cotton-spinner, for his invention of certain improvements in machinery or apparatus, for preparing roving, and for spinning, twisting, &c., winding fibrous substances. Sealed 18th December, 1826. No. 1, Vol. I, page 13.

————————, of Warrington, Lancaster, cotton-spinner, for improvements in machines adopted for spinning, doubling, twisting, roving, or preparing cotton, &c. Sealed 4th December, 1827. No. 32, Vol. VI, page 91.

— DE LA FONS, John Palmer, of George-street, Hanover-square, in the county of Middlesex, dentist, and Littlewart, William, of St. Mary Axe, in the city of London, mathematical instrument maker, for their invention of an improvement in securing or mooring ships, and other floating bodies, and apparatus for performing the same. Sealed 14th July, 1826. No. 1, Vol. I, page 27.

— DE LA GARDE, Count Augustus, of St. James's-square, Pall Mall, Middlesex, in consequence of a communication from a foreigner abroad, for making paper of various descriptions from the bullen or ligneous parts produced from certain texile plants, by the rural mechanical break (for the exclusive use of which he has already applied for a patent), which substances are to be employed alone or mixed with other suitable materials in the manufacture of paper. Sealed 20th February, 1827. No. 6, Vol. I, page 354.

— DERBYSHIRE, Philip, of Ely-place, Holborn, in the county of Middlesex, Esq., for a certain medicine, or embrocation, to prevent or alleviate sea-sickness, which may be usefully applied to other maladies. Sealed 4th December, 1828. No. 17, Vol. III, page 233.

— DE ROSEN, Count Adolphe Eugene, of Princes-street, Cavendish-square, in the county of Middlesex, in consequence of a communication made to him by a certain foreigner abroad, for an invention of a new engine for communicating power to answer the purpose of a steam-engine. Sealed 1st August, 1826. No. 3, Vol. I, page 156.

— DEROSNE, Charles, of Leicester square, in the county of Middlesex, Gent., in consequence of a communication from a foreigner abroad, and inventions by himself, for an invention of certain improvements in extracting sugar or syrup from cane juice and other substances containing sugar, and in refining sugar and syrups. Sealed 29th September, 1830. No. 38, Vol. VII, page 74.

— DESCROIZILLES, Paul, of Fenchurch-street, in the city of London, chemist, for improvements in apparatus for economising fuel in heating water and air, applicable to various purposes. Sealed 24th April, 1830. No. 42, Vol. VII, page 318.

— DE SORAS, Gabriel, of Leicester-square, Middlesex, Gent., and Wise, Stacey, and Wise, Charles, of Maidstone, Kent, paper-makers, in consequence of a communication from a foreigner abroad, for certain improve-

ments in sizing, glazing, and beautifying the materials employed in the manufacture of paper, pasteboard, &c. Sealed 21st August, 1827.
No. 18, Vol. III, page 317.

To DEXTER, Lambert, of King's Arms-yard, Coleman-street, in the city of London, Esq., in consequence of a communication from a foreigner abroad, for certain improvements in machinery for spinning wool, cotton, and other fibrous substances. Sealed 16th June, 1827.
No. 30, Vol. V, page 332.

— DICK, Maxwell, of the town of Irvine, in the county of Ayr, North Britain, bookseller and publisher, for an improved railroad and method of propelling carriages thereon by machinery, for conveying passengers, packets, &c., with great velocity. Sealed 21st May, 1829.
No. 51, Vol. IX, page 168.

— DICKINSON, Robert, of New Park-street, Southwark, Surrey, in consequence of a communication from a foreigner abroad, for an invention for the formation, coating, and covering of vessels or packages for containing, preserving, conveying, and transporting goods and products, whether in liquid or solid forms, and for other useful purposes. Sealed 8th December, 1826. No. 1, Vol. I, page 38.

——————— William, of Bridge-street, Southwark, Surrey, tin-plate merchant, for his invention of an improved buoyant bed or mattrass. Sealed 13th August, 1827. No. 9, Vol. II, page 156.

——————— George, of Buckland Mill, near Dover, Kent, paper manufacturer, for improvements in making paper by machinery. Sealed 21st February, 1828. No. 50, Vol. IX, page 99.

John, of Nash Mill, in the parish of Abbot's Langley, county of Hertford, paper manufacturer, for a new method of manufacturing paper, &c., into single sheets or pieces by machinery. Sealed 14th January, 1829. No. 51, Vol. IX, page 149.

— DICKSON, Isaac, of Chester-street, Grosvenor-place, Middlesex, Esq., in consequence of a communication from a foreigner abroad, and discoveries by himself, for an improved projectile. Sealed 8th December, 1828. No. 15, Vol. III, page 138.

— DIXON, John, and Vardy, James, both of Wolverhampton, for certain improvements in cocks, for drawing off liquid. Sealed 13th December, 1830. No. 46, Vol. VIII, page 205.

— DODD, Edward, of Berwick-street, Soho, Middlesex, musical instrument maker, for certain improvements on pianofortes. Sealed 26th July, 1827.
No. 34, Vol. VI, page 212.

— DODGSON, John William, of Lower Shadwell, Middlesex, pump and engine maker, for his invention of certain improvements in ships' scuppers, and which may be applied to other purposes. Sealed 17th November, 1829. No. 52, Vol. IX, page 205.

— DON, Thomas, of Lower James-street, Golden-square, parish of St. James's, city of Westminster, millwright, and Smith, Andrew, of Wells-street, Oxford-street, Middlesex, builder, for their invention of methods of making shutters and blinds of iron or steel, or any other metals, and improved method of fixing the same, and uniting in shutters the double properties of shutters and blinds. Sealed 15th June, 1827.
No. 2, Vol. I, page 90.

— DOWDING, William John, of the parish of Poulshot, in the county of Wilts, clothier, for certain improvements in machinery for rolling wool from the carding-engine. Sealed 22d November, 1827.
No. 13, Vol. III, page 4.

To DOWN, James, of Leicester, county Leicester, surgeon, for certain improvements in making gas for illumination, and in the apparatus for the same. Sealed 5th August, 1830. No. 39, Vol. VII, page 131.

— DOWNE, William, the elder, of Exeter, county of Devon, plumber and brass-founder, for certain improvements in water-closets. Sealed 25th August, 1826. No. 3, Vol. II, page 196.

— DOYLE, John, merchant, and Williams, John, ironmonger, and ship's hearth manufacturer, both of the Commercial-road, Middlesex, for an apparatus and process for separating salt from sea-water, and thereby rendering it fresh and fit for use. Sealed 4th August, 1826. No. 10, Vol. I, page 158.

— DRAKE, Francis Horatio Nelson, of Clayton-house, Devon, Esq., in consequence of a communication from a foreigner residing abroad, for certain improvements in tiles for covering houses and other buildings. Sealed 25th July, 1829. No. 49, Vol. IX, page 28.

— DUESBURY, William, of Bousal, in the county of Derby, colour manufacturer, and Knowlys, Thomas John, of Trinity College, Oxford, Esq., for their having invented certain improvements in tanning. Sealed 1st August, 1826. No. 3, Vol. I, page 159.

— DU MESNIL, Eugene, of Soho-square, Middlesex, Esq., for his invention of an improvement on, or additions to, stringed musical instruments. Sealed 1st August, 1827. No. 4, Vol. I, page 221.

— DUNN, Samuel, of Southampton, engineer, for certain improvements in generating steam. Sealed 21st February, 1831. No. 42, Vol. VII, page 310.

— DUTTON, James, jun., of Wootton-under-Edge, in the county of Gloucester, clothier, for his having invented certain improvements in propelling ships' boats, vessels, or floating bodies, by means of steam or other power. Sealed 19th May, 1829. No. 26, Vol. V, page 75.

— DUXBURY, Henry, of Pomeroy-street, Kent-road, Surrey, Gent., for his having invented a new machine for splitting hides and skins. Sealed 9th October, 1828. No. 48, Vol. VIII, page 300.

— ECKSTIEN, George Frederick, of Holborn, in the county of Middlesex, stove-grate manufacturer, and Gaunt, Thomas, of Chapman-street, Islington, in the same county, Gent., for an improved fire-grate. Sealed 14th April, 1831. No. 44, Vol. VIII, page 78.

— EDWARDS, Richard, of Dewsbury, in the county of York, leather and hock-seller, for an improvement on, or substitute for, glass, sand, or emery, and other scouring-paper or substances. Sealed 6th December, 1830. No. 42, Vol. VII, page 323.

— ERARD, Pierre, of Great Marlborough-street, Middlesex, musical instrument maker, in consequence of communications from a foreigner abroad, and discoveries by himself, for an invention of certain improvements in pianofortes. Sealed 20th February, 1827. No. 24, Vol. IV, page 324.

— ERICSSON, John, and Braithwaite, John, of the New-road, Fitzroy-square, Middlesex, engineers, for their new method of converting liquids into vapour or steam. Sealed 31st January, 1829. No. 22, Vol. IV, page 188.

———————————, of the New-road, Middlesex, engineers, for their improved method of manufacturing salt. Sealed 27th February, 1830. No. 35, Vol. VI, page 249.

To ERICSSON, John, of Brook street, Fitzroy-square, Middlesex, civil engineer, and Vignoles, Charles Blacker, of Furnival's-inn, London, for their having invented certain additions to the locomotive-engine. Sealed 7th September, 1830. No. 38, Vol. VII, page 81.

— EVANS, John, the younger, of Moreton-mills, near Wallingford, in the county of Berks, paper-maker, for his having invented certain improvements on steam-engines. Sealed 15th January, 1828. No. 37, Vol. VII, page 24.

————, Hugh, of Great Surrey-street, Surrey, lieutenant in the Royal Marine corps, and King, William Robert Hall, of Snow-hill, in the city of London, tin-plate worker, for their invention of a new table apparatus to promote the ease and economy of persons at sea, or on nautical excursions. Sealed 12th June, 1827. No. 12, Vol. II, page 338.

— EWBANK, Henry, and Lucas, Nathan, both of Mincing lane, in the city of London, merchants, for an improved process to be used in the dressing of paddy, or rough rice. Sealed 10th March, 1827. No. 6, Vol I, page 356.

— FARISH, William, of Cambridge, Jacksonian professor in the University, for his having invented an improved method of cleaning out watercourses. Sealed 4th December, 1828. No. 51, Vol. IX, page 117.

— FAWCETT, William, of Liverpool, in the county of Lancaster, engineer, and Clark, Matthew, of the island of Jamaica, engineer, for their improved apparatus for the better crystallisation of sugar from the canes Sealed 4th December, 1827. No. 32, Vol VI, page 92.

— FELTON, John, of Hinckley, in the county of Leicester, machine maker, for a machine for an expeditious and correct mode of giving a fine edge to knives, razors, and scissors, and other cutting instruments. Sealed 28th June, 1827. No. 1, Vol. I, page 41.

— FERGUSON, Charles Augustus, of Mill-wall, in the parish of All Saints, Poplar, Middlesex, mast-maker, and Atlee, James Falconer, of Prospect-place, Deptford, Kent, Gent., for their invention of certain improvements in made masts. Sealed 22d December, 1827. No. 37, Vol. VII, page 26

— FERRABEE, John, of the Thrupp-mill and foundry, parish of Stroud, and county of Gloucester, engineer, for improvements in machinery, for preparing the pile or face of woollen or other cloths requiring such process. Sealed 23d December, 1830. No. 43, Vol. VIII, page 26.

— FITZMAURICE, Lewis Roper, of Jamaica-place, Commercial-road, Middlesex, master mariner in the Royal Navy, for improvements on ship's and other pumps, which are also applicable, by certain alterations, to turning lathes and other purposes. Sealed 11th August, 1828. No. 50, Vol. IX, page 103.

— FONZI, Joseph Ange, of Upper Marylebone-street, Middlesex, Esq., for certain improvements or additions to fire-places. Sealed 9th September, 1829. No. 28, Vol. V, page 199.

— FORBES, John, of Cheltenham, in the county of Gloucester, architect and surveyor, for his new method of burning or consuming smoke. Sealed 15th December, 1828. No. 51, Vol. IX, page 140.

— FORD, William John, of the parish of Mildenhall, in the county of Suffolk, farrier, for his invention of certain improvements in the make, use, and application of bridle-bits. Sealed 6th September, 1827. No. 36, Vol. VI, page 333.

———— Thomas, of Canonbury-square, Islington, Middlesex, chemist, nephew and successor to the late Robert Ford, for his having invented

certain improvements in the medicine for the cure of coughs, colds, asthmas, and consumptions, known by the name of Ford's Balsam of Horehound. Sealed 12th August, 1830. No. 42, Vol. VII, page 327.

To FORD, John, of Wandsworth-road, parish of Lambeth, and county of Surrey, machine-maker, for certain improvements in machinery for clearing, opening, scribbling, combing, slubbing, and spinning wool, and for carding, roving, or stiffening and spinning cotton, flax, &c., and for spinning or twisting long stapled flax, hemp, &c., either separately or combined. Sealed 13th May, 1828. No. 50, Vol. IX, page 79.

— FOURVILLE, de Ferdinand, of Piccadilly, in the county of Middlesex, merchant, for certain improvements in filtering apparatus. Sealed 26th March, 1828. No. 22, Vol. IV, page 206.

— FOWLER, Thomas, of Great Torrington, in the county of Devon, stationer, for certain improvements in or for raising and circulating hot water, oils, and other hot fluids, for domestic and other purposes. Sealed 2d October, 1828. No. 50, Vol. IX, page 82.

— FOXWELL, Philip, clothier, Clark, William, cloth-dresser, and Clark, Benjamin, cloth-dresser, all of Dye-House Mill, in the parish of Minchinhampton, county of Gloucester, for certain improvements in machinery for shearing, cropping, or cutting and finishing woollen and other cloths and cassimeres. Sealed 19th August, 1828. No. 50, Vol. IX, page 106.

— FRASER, James, of Limehouse, in the county of Middlesex, engineer, for his having found out a new and improved arrangement of flues, to communicate with culinary apparatus, such as steam or water boilers, ovens, hot plates, hot closets, stewing-stoves, to render them more compact, and to appropriate parts thereof to effect other useful purposes. Sealed 27th January, 1829. No. 51, Vol. IX, page 147.

— FRAZER, James, of Houndsditch, in the city of London, engineer, for improved capstans and windlasses. Sealed 11th January, 1827. No. 6, Vol. I, page 336.

————————, of Houndsditch, in the city of London, engineer, for his improved boilers for steam-engines. Sealed 11th January, 1827. No. 6, Vol. I, page 337.

— FREEMAN, Daniel, of Wakefield, York, saddle and harness-maker, for his improvements in collars for horses and other cattle. Sealed 14th July, 1826. No. 1, Vol. I, page 30.

— FULLWOOD, Matthew, jun., of Stratford, in the county of Essex, Gent., for his having invented cement, mastic, or composition, which he intends to denominate German cement. Sealed 6th May, 1828. No. 32, Vol. VI, page 94.

— FURNIVAL, William, of Wharton, in the county of Chester, Esq., for his invention of certain improvements in evaporating brine. Sealed 21st February, 1831. No. 45, Vol. VIII, page 145.

— FULTON, John Alexander, of Lawrence Pountney-lane, Cannon-street, in the city of London, spice-merchant, for his invention of a process of preparing or bleaching pepper. Sealed 26th November, 1827. No. 5, Vol. I, page 294.

————————————, of Lawrence Pountney-lane, in the city of London, merchant, for his having invented an improvement in the preparation of pepper. Sealed 20th March, 1830. No. 34, Vol. VI, page 200.

— GALLOWAY, Elijah, of the London-road, in the parish of St. George the Martyr, Surrey, engineer, for his improved rotatory steam-engine. Sealed 29th December, 1826. No. 14, Vol. III, page 99.

To GALLOWAY, Elijah, of King-street, in the borough of Southwark, engineer, for his invention of certain machinery for propelling vessels, which improvements are applicable to other purposes. Sealed 2d July, 1830. No. 34, Vol. VI, page 193.

— GARDNER, Richard, and Gardner, Joseph, both of Liverpool, in the county of Lancaster, merchants, and Pearce, Henry George, of the same place, master-mariner, for an improved fid. Sealed 7th September, 1830. No. 42, Vol. VII, page 332.

— GAUNT, Thomas, of Chapman-street, Islington, in the county of Middlesex, Gent., and Eckstein, George Frederick, of Holborn, in the same county, stove-grate manufacturer, for their having invented an improved fire-grate. Sealed 14th April, 1831. No. 41, Vol. VIII, page 78.

— GEITHNER, Benjamin, of Birmingham, in the county of Warwick, brass-founder, for his invention of certain improvements on castors for furniture, &c. Sealed 15th December, 1827. No. 36, Vol. VI, page 381.

— GEORGE, John, of Chancery-lane, in the county of Middlesex, Esq., barrister-at-law, for his invention for preserving decked ships or vessels, so as to render them less liable to dry-rot, and for preserving goods on board thereof from damage by heat. Sealed 18th December, 1827. No. 30, Vol. V, page 326.

— GETHEN, ——, late of Furnival's Inn, Middlesex, but now of Dursley, Gloucester, Gent., for certain improvements in dressing woollen cloths. Sealed 21st November, 1829. No. 45, Vol. VIII, page 131.

— GIBBS, Joseph, of Crayford, in the county of Kent, Esq., for his invention of improvements in evaporating fluids applicable to various purposes. Sealed 6th November, 1830. No. 43, Vol. VIII, page 16.

——————, of Crayford Mills, Kent, timber-merchant, for his invention of improvements in machinery for cutting marble, wood, and other substances. Sealed 12th November, 1829. No. 52, Vol. IX, page 209.

— GILBERTSON, James, of Hertford, in the county of Herts, grocer, for his invention of an improvement in the construction of furnaces for consuming their own smoke. Sealed 15th January, 1828. No. 10, Vol. II, page 214.

— GILLET, Augustus Whiting, of Birmingham, in the county of Warwick, merchant, in consequence of a communication made to him by George Bridgman, a foreigner, residing in New Haven, Connecticut, in the United States of North America, for a certain improvement in the construction and application of wheels to carriages of pleasure or burden or to machines for moving heavy bodies. Sealed 4th November, 1830. No. 35, Vol. VI, page 265.

— GILLMAN, William, of Whitechapel, Middlesex, engineer, Pearson, Charles, jun., of Greenwich, Kent, Esq., and Witty, Richard, of Hanley, in the county of Stafford, engineer, for their invention of new or improved methods of applying heat to certain useful purposes. Sealed 13th December, 1826. No. 6, Vol. I, page 334.

— GOOCH, William, of Mount-street, Berkeley-square, Middlesex, for his invention of certain improvements on baths of different descriptions, applicable also to other purposes. Sealed 7th November, 1829. No. 52, Vol. IX, page 211.

— GOSSAGE, William, of Leamington Priors, in the county of Warwick, chemist, for his invention of certain improvements in the construction of cocks for the passage of fluids. Sealed 2d January, 1828. No. 6, Vol. I, page 336.

To GOTTLIEB, Andrew, of Jubilee-place, Mile End-road, Middlesex, locksmith, for certain improvements and additions to locks and keys. Sealed 1st June, 1829. No. 24, Vol. IV, page 343.

— GOUGH, Nathan, of Salford, in the county of Lancaster, civil-engineer, for his invention of an improved method of propelling carriages or vessels by steam or other power. Sealed 20th March, 1828. No. 17, Vol. III, page 237.

— GOULSON, Benjamin, of Pendleton, near Manchester, in the county of Lancaster, surgeon, for his invention of certain improvements in the manufacturing of farina and sugar from vegetable productions. Sealed 14th December, 1829. No. 43, Vol. VIII, page 31.

— GRAHAM, Augustus, of North America, but now of West-street, Finsbury, in the city of London, Gent., in consequence of a communication by a foreigner abroad, for certain improvements in the application of springs to carriages. Sealed 17th December, 1830. No. 47, Vol. VIII, page 242.

— GREEN, Richard, of Blackwall, in the county of Middlesex, shipbuilder, for his having invented certain improvements in the construction of main-masts. Sealed 5th February, 1829. No. 30, Vol. V, page 337.

— GRIFFIN, James, of Witty Moor Works, near Dudley, in the county of Warwick, scythe manufacturer, for an improvement in the manufacturing of scythe backs, chaff knife backs, and hay-knife backs. Sealed 26th April, 1828. No. 24, Vol. IV, page 339.

— GRISENTHWAITE, William, of Nottingham, Esq., for a new process of making sulphate of magnesia, commonly called Epsom salts. Sealed 11th August, 1828. No. 31, Vol. VI, page 22.

————————————, of Nottingham, Esq., for his having invented certain improvements in steam-engines. Sealed 27th February, 1830. No. 42, Vol. VII, page 342.

— GRUBBE, James Andrew Hunt, of Stanton, St. Bernard, in the county of Wilts, clerk, for his having invented a transmitting heat wall for ripening fruit. Sealed 9th January, 1828. No. 17. Vol. III, page 257.

— GUNTHER, John Henry, of Camden-town, in the county of Middlesex, piano forte manufacturer, for certain improvements in piano-fortes. Sealed 10th July, 1828. No. 38, Vol. VII, page 82.

— GUPPY, Thomas Richard, of Bristol, sugar-refiner, for his having invented a new apparatus for granulating sugar. Sealed 6th March, 1830. No. 42, Vol. VII, page 326.

— GURNEY, Goldsworthy, late of Argyle-street, Hanover-square, but now of Albany-road, Regent's-park, Middlesex, surgeon, for certain improvements in locomotive engines and other applications connected therewith. Sealed 11th October, 1827. No. 33, Vol. VI, page 154.

— GUY, John, and Harrison, Jacob, both of Workington, in the county of Cumberland, straw-hat manufacturers, for their invention of an improved method of preparing straw and grass, to be used in the manufacture of hats and bonnets. Sealed 14th July, 1826. No. 3, Vol. I, page 150.

— HADEN, George, of Trowbridge, in the county of Wilts, engineer, for his having invented certain improvements in machinery for dressing cloth. Sealed 2nd March, 1829. No. 18, Vol. III, page 287.

— HAGUE, John, of Cable-street, Wellclose square, in the parish of St. George in the East, in the county of Middlesex, engineer, for his invention of a new method of working cranes or tilt hammers. Sealed 30th August, 1827. No. 2, Vol. I, page 94.

To HAGUE, John, of Cable-street, Wellclose-square, Middlesex, engineer, for his having invented certain improvements in the method of expelling the molasses or syrup from sugar. Sealed 6th December, 1828.
No. 18, Vol. III, page 303.

— HALE, William, of Colchester, in the county of Essex, merchant, for his invention of certain improvements in machinery for propelling vessels. Sealed 22nd December, 1827. No. 10, Vol. II, page 213.

— HALL, Joseph, and Hull, Thomas, his Son, both of Leeds, in the county of York, braziers and brass-founders, for their having discovered an improvement in the making of metallic cocks for drawing off liquids. Sealed 11th October, 1827. No. 7, Vol. II, page 23.

———, William Wilmot, of the city of Baltimore, North America, now residing in the city of Westminster, attorney-at-law, in consequence of a communication by a foreigner abroad, for a new invention of an engine for moving and propelling ships, carriages, mills, and machinery of every kind. Sealed 15th January, 1827. No. 8, Vol. II, page 59.

———, Richard, of Plymouth, Devon, tailor and woollen-draper, for his having invented a composition applicable to certain fabrics or substances, from which may be manufactured boots, shoes, and various other articles. Sealed 10th March, 1829. No. 23, Vol. IV, page 288.

———, James, Jun., of Ordsall, near Manchester, dyer, for his invention of certain improvements in dying piece goods by machinery. Sealed 2nd January, 1828. No. 39, Vol. VII, page 149.

———, Samuel, of Basford, in the county of Nottingham, cotton-manufacturer, for his having invented a new method of, and apparatus for, generating steam and various gases, to produce motive power. Sealed 31st May, 1828. No. 45, Vol. VIII, page 123.

— HALLIDAY, Francis, of Ham, Surrey, Esq., for his invention of certain improvements in raising or forcing water. Sealed 25th August, 1826.
No. 5, Vol. I, page 295.

———————, of Ham, Surrey, Esq., for his invention of certain improvements on apparatus used in drawing boots on and off. Sealed 4th October, 1826. No. 6, Vol. I, page 350.

— HANCOCK, John Gregory, of Birmingham, in the county of Warwick, plate-bender and canister-hinge manufacturer, for his invention of a new elastic rod for umbrellas and other like purposes. Sealed 21st December, 1826. No. 2, Vol. I, page 98.

———————, Walter, of Stratford, in the county of Essex, engineer, for his invention of improvements upon steam-engines. Sealed 4th July, 1827. No. 33, Vol. VI, page 152.

— HANCORNE, Edward, of Skinner-street, in the city of London, nail manufacturer, in consequence of a communication from a foreigner abroad, for certain improvements in making nails. Sealed 16th October, 1828.
No. 51, Vol. IX, page 135.

— HARLAND, William, M.D., of Scarborough, in the county of York, for his having invented certain improvements in apparatus or machinery for propelling locomotive carriages, applicable also to other purposes. Sealed 21st December, 1827. No. 39, Vol. VII, page 143.

— HARRIS, George, of Brompton-crescent, Middlesex, captain in the Royal Navy, for improvements in the manufacture of ropes and cordage, canvas, and other fabrics, from substances hitherto unused for that purpose. Sealed 15th September, 1829. No. 32, Vol. VI, page 83.

———————, George Daniel, of Field-place, near Stroud, in the county of Gloucester, clothier, for improvements in dressing and preparing woollen

yarn, and in the cleansing, dressing, and finishing woollen cloths, and other fabrics, and in the apparatus for performing the same. Sealed 15th January, 1828. No. 35, Vol. VI, page 258.

To HARRISON, Jacob, and Guy, John, both of the parish of Workington, in the county of Cumberland, straw-hat manufacturers, for their invention of an improved method of preparing straw and grass, to be used in the manufacture of hats and bonnets. Sealed 14th July, 1826. No. 3, Vol. I, page 150.

— HARSLEBEN, Charles, of Great Ormond-street, Queen-square, Middlesex, Esq., for his invention of machinery for facilitating the working of mines, and for facilitating the extraction of diamonds and other precious stones, gold, silver, and other metals, from the ore, the earth, or the sand, also applicable to other purposes. Sealed 13th December, 1826. No. 8, Vol. II, page 79.

———————, of Great Ormond-street, Queen-square, Middlesex, Esq., for his invention of certain improvements in building ships and other vessels, and in machinery for propelling same. Sealed 20th December, 1826. No. 16, Vol. III, page 204.

———————, of New Ormond-street, Middlesex, Esq., for certain improvements in machinery to be used in navigation, chiefly applicable to propelling ships, applicable also to other purposes. Sealed 3rd April, 1828. No. 25, Vol. V, page 31.

— HAWKS, John, of Weymouth-street, Portland-place, Middlesex, iron-manufacturer, for his having invented an improvement in the construction of ships' cables and hawser-chains. Sealed 10th July, 1828. No. 12, Vol. II, page 341.

— HAYCRAFT, William Tutin, of the Circus, Greenwich, Kent, doctor of medicine, for his invention of certain improvements in steam-engines. Sealed 11th June, 1830. No. 35, Vol. VI, page 270.

— HEARD, Edward, of Devonshire-street, Vauxhall-road, Surrey, chemist, for certain improvements in illumination, or producing artificial light. Sealed 12th February, 1829. No. 19, Vol. IV, page 27.

— HEISCH, Philip Jacob, of America-square, in the city of London, merchant, in consequence of a communication from a foreigner abroad, for certain improved machinery for spinning cotton. Sealed 20th February, 1827. No. 15, Vol. III, page 149.

— HEWES, Thomas Cheek, of Manchester, engineer, for having invented various improvements in the form and construction of windmills and their sails. Sealed 11th January, 1829. No. 25, Vol. V, page 16.

— HIGGINS, John Lane, of Oxford-street, Middlesex, Esq., for certain improvements in the construction of cat-blocks and fish-hooks, and in the application thereof. Sealed 14th July, 1826. No. 1, Vol. I, page 34.

———————, of Oxford-street, Middlesex, Gent., for certain improvements in wheel-carriages. Sealed 11th August, 1828. No. 50, Vol. IX, page 62.

— HILL, John, of Bath, and Burstall, Timothy, of Leith, Scotland, engineers, for their invention of certain improvements in machinery for propelling locomotive carriages. Sealed 22nd August, 1826. No. 12, Vol. II, page 330.

— HILLMAN, Thomas, of Mill-wall, Poplar, Middlesex, mast-maker, for certain improvements in the construction and fastening of made-masts. Sealed 1st May, 1828. No. 23, Vol. IV, page 278.

— HINDMARSH, Ralph, of the town and county of Newcastle-upon-Tyne,

master-mariner, for his having invented an improvement in the construction of capstans and windlasses. Sealed 1st February, 1827.
No. 8, Vol. II, page 66.

To HIRST, Henry, of Leeds, York, clothier, for certain improvements in manufacturing woollen cloth. Sealed 27th February, 1830.
No. 31, Vol. VI, page 12.

———, Samuel, of Morley, in the parish of Batley, York, clothier, and Story, William, of the same place, plumber and glazier, for their having discovered certain materials, which when combined are suited to be employed in scouring, milling, or fulling, cleansing, and washing of cloths, and other fabrics, and by the employment of which materials considerable improvements in those processes are effected. Sealed 10th March, 1829. No. 19, Vol. IV, page 25.

— HITCH, Caleb, the younger, of Ware, in the county of Herts, brick-maker, for his having invented an improved wall for building purposes. Sealed 21st February, 1828. No. 12, Vol. II, page 324.

— HOBSON, William, of Mark-field, Stamford-hill, Middlesex, Gent., for his new-invented improved method of paving streets, lanes, roads, and carriage-ways in general. Sealed 15th January, 1827.
No. 1, Vol. I, page 37.

———, Jonathan Cripps, of Sheffield, York, merchant, Rodgers, George, of the same place, cutler, and Brownill, Jonathan, of the same place, cutler, for their having invented certain improvements on table-forks. Sealed 23d December, 1828. No. 15, Vol. III, page 42.

— HOLLAND, Thomas Stanhope, of the city of London, Esq., for his invention of certain combinations of machinery for generating and communicating power and motion applicable to propelling of fixed machinery, also floating bodies, carriages, &c. Sealed 19th December, 1827.
No. 6, Vol. I, page 346.

— HOOD, William John Hobson, of Arundel-street, Strand, Middlesex, lieutenant in the Royal Navy, for his invention of certain improvements on pumps or machines for raising or forcing water, chiefly applicable to ships. Sealed 26th May, 1827. No. 20, Vol. IV, page 77.

— HOOPER, Charles, of Spring-gardens, in the parish of Marston Bigott, Somerset, shear-grinder, for his having invented a new and improved machine for shearing and cropping woollen and other cloths. Sealed 10th January, 1828. No. 41, Vol. VII, page 281.

— HORTON, Joseph, of West Bromwich, Stafford, boiler-maker, for his invention of an improved method of forming and making of hollow cylinders, guns, ordnance, retorts, and various other hollow articles in wrought iron or steel, or composed of both those metals. Sealed 11th October, 1827. No. 36, Vol. VI, page 334.

— HUTCHISON, John, of Liverpool, merchant, for certain improvements in machinery for spinning cotton, silk, linen, woollen, and other fibrous substances, communicated from a foreigner abroad. Sealed 30th July, 1829. No. 30, Vol. VII, page 153.

— IBOTSON, Richard, of Poyle, in the parish of Stanwell, Middlesex, paper-manufacturer, for his having found out improvements in the method or apparatus for separating the knots from paper, stuff, or pulp, used in the manufacture of paper. Sealed 29th July, 1830.
No. 40, Vol. VII, page 225.

— ISAAC, John Johnson, of Star-street, Edgeware-road, Middlesex, engineer, for improvements in propelling vessels, boats, and other floating bodies. Sealed 5th July, 1828. No. 46, Vol. VIII, page 188.

To JACKSON, Thomas, of Red Lion-street, Holborn, Middlesex, watch-maker, for a new metal stud, to be applied to boots, shoes, and other like articles of manufacture. Sealed 13th May, 1828.
No. 38, Vol. VII, page 83.

— JARRIN, William Alexis, of New Bond-street, Middlesex, Italian confectioner, for his invention of certain improvements in apparatus for cooling liquids. Sealed 13th August, 1827.
No. 17, Vol. III, page 260.

— JEFFERIES, William, of London-street, Radcliffe, Middlesex, brass-manufacturer, for certain improvements in calcining, or roasting and smelting, or extracting metals and semi-metals from various kinds of ores and matters containing metals or semi-metals. Sealed 20th February, 1827. No. 6, Vol. I, page 352.

— JENAR, Rene Florentine, of Bunhill-row, Middlesex, Gent., for a new method of filling-up with metal or other suitable material the holes in wire-gauze, or other similar substances, which he denominates metallic linen. Sealed 4th July, 1827. No. 8, Vol. II, page 92.

————————, of Bunhill-row, Middlesex, Gent., for his invention of certain improvements in lamps. Sealed 4th July, 1827.
No. 34, Vol. VI, page 206.

— JENOUR, Joshua, Jun., of Brighton street, in the parish of St. Pancras, Middlesex, Gent., for his new-invented cartridge or case, and method of more advantageously enclosing therein shot or other missiles for loading fire-arms of different descriptions. Sealed 28th November, 1827.
No. 5, Vol. I, page 293.

— JOBBINS, Daniel, of Uley, in the county of Gloucester, millman, for an improved method by certain machinery applicable to stocks or pulling machine of milling and scouring woollen cloths, and other fabrics requiring such process. Sealed 3rd June, 1828.
No. 26, Vol. V, page 81.

— JOCELYN, Nathaniel, of Newhaven, State of Connecticut, North America, now of the city of London, artist, being a communication from foreigners abroad, and from study of his own, for certain improvements in the manufacturing of bankers' cheques and other similar instruments, by which forgeries and alterations in the same are prevented or detected. Sealed 3rd August, 1829. No. 51, Vol. IX, page 176.

— JOHNSON, William, of Droitwich, in the county of Worcester, Gent., for certain improvements in the process and form of apparatus for the manufacture of salt and other purposes. Sealed 18th December, 1826.
No. 7, Vol. II, page 13.

— JONES, Theodore, of Coleman-street, in the city of London, accountant, for his having invented improvements on wheels for carriages. Sealed 11th of October, 1826. No. 3, Vol. I, page 154.

————, Samuel, of the Strand, Middlesex, artist, in consequence of a communication from a foreigner abroad, for a new method of producing instantaneous light. Sealed 10th December, 1828.
No. 15, Vol. III, page 154.

, Robert Griffith, of Brewer-street, Golden-square, Middlesex, in consequence of a communication from a foreigner abroad, for an invention of ornamenting china and other compositions, which he denominates letrophanic, translucid or opaque china. Sealed 13th March, 1828.
No. 18, Vol. III, page 319.

————, Joseph, of Amlwch, in the county of Anglesea, North Wales, Gent., for his invention of an improvement in certain parts of the process of smelting or obtaining metallic copper from copper ore. Sealed 16th July, 1828. No. 31, Vol. VI, page 21.

To JONES, John, of Leeds, in the county of York, brush-maker, for his having invented certain improvements in machinery for dressing and finishing woollen cloths. Sealed 21st August, 1829.
No. 45, Vol. VIII, page 126.

————, William, and Ledsom, Daniel, of Birmingham, manufacturers, for certain improvements in machinery for cutting sprigs, brads, and nails. Sealed 4th December, 1827. No. 20, Vol. IV, page 84.

— JOSEPHS, Edward, of Haydon-square, Middlesex, merchant, for his having invented certain improvements on the wheels, axletrees, and other parts of carts, waggons, and other conveyances. Sealed 18th December, 1828. No. 51, Vol. IX, page 125.

— KILBY, Rev. Thomas, of Wakefield, in the county of York, clerk, and Bacon, Hugh Ford, of Leeds, in the same county, Gent., for their having invented a new or improved gas lamp or burner. Sealed 2nd July, 1829.
No. 25, Vol. V, page 22.

— KING, William Robert Hall, of Snow-hill, in the city of London, tin-plate worker, and Evans, Hugh, of Great Surrey-street, Surrey, lieutenant in our Royal Marine Corps, for their invention of a new table apparatus to promote the comfort and economy of persons at sea. Sealed 12th June, 1827. No. 12, Vol. II, page 338.

— KINGSTON, William, master-millwright, of our Dock-yard, Portsmouth, and Stebbing, George, mathematical instrument-maker, High-street, Portsmouth, for their invention of certain improvements on instruments for the more readily ascertaining the trim and stability of ships. Sealed 20th December, 1826. No. 6, Vol. I, page 351.

— KITCHEN, William Henry, of High-street, Bloomsbury, Middlesex, ironmonger, and Smith, Andrew, late of York-terrace, Westminster, but now of Princes-street, Leicester-square, merchant, for their invention of improvements in window-frames, sashes, shutters, and doors, designed to afford security against burglars, as also to exclude the weather. Sealed 7th February, 1829. No. 25, Vol. V, page 26.

— KNELLER, William Godfrey, of Pearl-street, Spitalfields, Middlesex, chemist, for his invention of certain improvements in evaporating sugar, applicable also to other purposes. Sealed 27th November, 1828.
No. 24, Vol. IV, page 321.

— KNIGHT, Henry, of Birmingham, clock-maker, for a machine for ascertaining the attendance to duty of any watchman or other person, applicable also to other purposes. Sealed 28th April, 1827.
No. 32, Vol. VI, page 84.

— KNOWLES, John, of Farnham, Surrey, hop-planter, for a certain machine for drawing hop-poles out of the ground previous to picking the hops, called a hop-drawer, by a lever and fulcrum. Sealed 13th August, 1830. No. 32, Vol. VI, page 77.

————————, Margaret, of Lavender-hill, Battersea, Surrey, spinster, for her invention of an improvement in axle trees for and mode of applying the same to carriages. Sealed 4th July, 1829.
No. 49, Vol. IX, page 24.

— KNOWLYS, Thomas John, of Trinity College, Oxford, Esq., and Duesbury, William, of Bousal, Derby, colour manufacturer, for their invention of improvements in tanning. Sealed 1st August, 1826.
No. 3, Vol. I, page 159.

— LACY, John George, of Camomile-street, in the city of London, gun manufacturer, and Davis, Samson, of East Smithfield, Middlesex, gun-cock maker, for their having invented certain improvements in the construction of guns and fire-arms. Sealed 6th December, 1830.
No. 44, Vol. VIII, page 83.

To LAMBERT, Josias, of Liverpool-street, in the city of London, Esq., for an improvement in the process of making iron applicable at the smelting of the ore, and at various subsequent stages of the process up to the completion of the rods or bars, and for the improvement of the quality of inferior iron. Sealed 30th March, 1829. No. 21, Vol. IV, page 142.

————————, of Liverpool-street, in the city of London, Esq., for an improvement in the process of making iron applicable to the smelting of the ore, at various subsequent stages of the process up to the completion of the rods or bars, and a new process for improving the quality of inferior iron. Sealed 4th February, 1830. No. 29, Vol. V, page 276.

— LAWES, Thomas, of the Strand, Middlesex, lace-manufacturer, for an improvement in the manufacture of bobbin-net lace. Sealed 10th December, 1828. No. 16, Vol. III, page 208.

— LAWRENCE, David, of Stroud, and Crundwell, John, of Ashford, both in the county of Kent, gun-makers, for certain improvements in apparatus to be applied to fowling-pieces and other fire-arms in place of locks. Sealed 15th September, 1829. No. 52, Vol. IX, page 206.

————————, John, of Birmingham, silversmith, and Rudder, William, of Eye, in the county of Gloucester, Gent., for their having invented an improvement in saddles and girths, by an apparatus affixed to either of them. Sealed 10th August, 1830. No. 36, Vol. VI, page 316.

— LAWSON, Samuel, and Walker, Mark, of Leeds, York, machine-makers and flax-spinners, for improvements in machinery for preparing and dressing hemp, flax, silk, and other fibrous substances. Sealed 9th October, 1828. No. 14, Vol. III, page 83.

— LEDSOM, Joseph Frederick, of Birmingham, merchant, for an improvement for purifying coal-gas by means not hitherto used. Sealed 2nd March, 1827. No. 4, Vol. I, page 228.

————————, Daniel, and Jones, William, of Birmingham, manufacturers, for certain improvements in machinery for cutting sprigs, brads, and nails. Sealed 4th December, 1827. No. 20, Vol. IV, page 84.

— LEE, George William, of Bagnio-court, Newgate-street, in the city of London, merchant, for certain improvements in machinery for spinning cotton and other fibrous substances, communicated by a foreigner. Sealed 2d May, 1829. No. 24, Vol. IV, page 342.

— LEESON, William, of Birmingham, in consequence of a communication by his late partner, William, Tott, of the same place, deceased, for certain improvements in harness and saddlery, applicable also to other purposes. Sealed 8th July, 1829. No. 51, Vol. IX, page 170.

— LEVERS, John, of Nottingham, machine-maker, for his having invented certain improvements in machinery for the manufacture of bobbin-net lace. Sealed 3rd March, 1828. No. 22, Vol. IV, page 185.

————————, John, of Nottingham, machinist, for his having invented certain improvements in machinery for making bobbin-net lace. Sealed 18th December, 1828. No. 23, Vol. IV, page 261.

–, John, of New Radford, near Nottingham, lace machine-maker, for certain improvements in machinery for making bobbin-net lace. Sealed 8th June, 1830. No. 41, Vol. VII, page 273.

— LIHOU, John, of Guernsey, but now of the Naval club-house, Bond-street, Middlesex, a commander of our Royal Navy, for an improved method of constructing ship's pintles for hanging the rudder. Sealed 14th April, 1829. No. 20, Vol. IV, page 64.

— LITTLEWART, William, of St. Mary Axe, in the city of London,

mathematical instrument-maker, and De la Fons, John Palmer, of George-street, Hanover-square, Middlesex, dentist, for their invention of an improvement in securing or mooring ships and other floating bodies, and apparatus for performing same. Sealed 14th July, 1826.
No. 1, Vol. I, page 27.

To LLANOS, Valentine, of Hampstead, Middlesex, Gent., for an invention of improvements on bits, communicated by a person residing abroad. Sealed 15th December, 1828. No. 50, Vol. IX, page 102.

— LOCKYER, William, of Bath, brush-maker, for an improvement in making brushes, and in the manufacture of materials and the application thereof to the manufacture of brushes, &c. Sealed 28th April, 1827.
No. 2, Vol. I, page 98.

— LOSH, William, of Benton-house, in the county of Northumberland, Esq., for improvements in the formation of iron-rails for rail-roads, and in the chairs or pedestals upon which the rails may be placed. Sealed 18th September, 1828. No. 51, Vol. IX, page 123.

— LOUIS, Abraham, of Dean-street, Birmingham, mechanic, for a mechanical volti suvito for turning the leaves of music books. Sealed 10th December, 1828. No. 51, Vol. IX, page 145.

— LOWREY, Jane Bentley, of Exeter, straw hat manufacturer, for certain improvements in the manufacturing of hats and bonnets. Sealed 25th March, 1828. No. 21, Vol. IV, page 142.

— LUCAS, Nathan, and Ewbank, Henry, both of Mincing-lane, in the city of London, for an improved process in dressing paddy or rough rice. Sealed 10th March, 1827. No. 6, Vol. I, page 356.

— LUKIN, Lionel, of Lewisham, Kent, in consequence of communications from a foreigner, and discoveries by himself, for improvements in collars and saddles for horses. Sealed 1st August, 1827.
No. 18, Vol. III, page 304.

— MACDOUGALL, Daniel, of Edinburgh, horticulturist, for his invention of certain improvements on, or additions to, syringes for garden and other purposes. Sealed 10th November, 1829.
No 52, Vol. IX, page 218.

— MACHELL, Thomas, of Berners-street, Oxford-street, Middlesex, surgeon, for his invention of certain improvements on apparatus applicable to the burning of oil and other inflammable substances. Sealed 8th December, 1826. No. 12, Vol. II, page 320.

— MACKAY, Peter, of Great Union-street, Borough-road, Surrey, Gent., in consequence of a communication by a foreigner abroad, for certain improvements by which the names of streets, &c. will be rendered more durable and conspicuous. Sealed 13th December, 1826.
No. 4, Vol. I, page 226.

— MACNEIL, John Benjamin, of Foleshill, Coventry, Warwick, engineer, for certain improvements in preparing and applying materials for making more durable roads and other ways, also applicable to other purposes. Sealed 6th May, 1828. No. 39, Vol. VII, page 148.

— MADELEY, William, of Yardly, Worcester, farmer, and of Birmingham, manufacturer, for an apparatus for detecting depredators, trespassers, or any animals, denominated the humane snare. Sealed 28th March, 1829.
No. 38, Vol. VII, page 85.

— MANN, William, of Effra-road, Brixton, in the parish of Lambeth, and county of Surrey, Gent., for his having found out that by the application of compressed air, power and motion can be communicated to fixed machinery, carriages, locomotive machines, ships, and other floating bodies. Sealed 1st June, 1829. No. 48, Vol. VIII, page 317.

To MANTON, George Henry, of Dover-street, Piccadilly, Middlesex, gun-maker, for an improvement in locks for fire-arms. Sealed 2nd September, 1829. No. 51, Vol. IX, page 133.

— MARBOT, Antoine Adolphe Marcellan, of Norfolk-street, Strand, Middlesex, merchant, in consequence of a communication from a foreigner abroad, for improved machinery for cutting wood into all kinds of mouldings or fluted work. Sealed 3rd February, 1827.
No. 22, Vol. IV, page 202.

— MARRIOTT, Henry, of Fleet-street, in the city of London, ironmonger, and Siebe, Augustus, of Princes-street, Leicester-square, Middlesex, machinist, for improvements in hydraulic machines. Sealed 29th March, 1828. No. 8, Vol. II, page 89.

— MARSHALL, William, of Fountain-grove, Huddersfield, York, shear manufacturer, for improvements in machinery for cutting or shearing, and finishing cloths, &c., from wool or other raw materials. Sealed 26th April, 1828. No. 17, Vol. III, page 255.

————, James, of Chatham, Kent, lieutenant in the Royal Navy, for improvements in mounting guns for sea or other service. Sealed 26th June, 1827. No. 20, Vol. IV, page 70.

-, John, of Southampton-street, Strand, Middlesex, tea-dealer, for a method of making an extract from cocoa, denominated Marshall's extract of cocoa. Sealed 10th December, 1829.
No. 30, Vol. V, page 336.

— MARTINEAU, Robert, and Rudder, Enoch William, of Birmingham, cock-founders, for improvements in cocks. Sealed 27th February, 1830.
No. 42, Vol. VII, page 332.

— MASON, William, of Castle-street East, Oxford-street, Middlesex, patent axletree-maker, for improvements in mail axletrees and boxes. Sealed 15th January, 1827. No. 12, Vol. II, page 334.

— MAUDSLEY, Joseph, of Lambeth, Surrey, engineer, for improvements on steam-engines. Sealed 1st August, 1827.
No. 34, Vol. VI, page 211.

— MAXWELL, Henry, of Pall-mall, Middlesex, spur-maker, for an improvement in spring spur sockets. Sealed 13th August, 1828.
No. 37, Vol. VII, page 31.

— M'INNES, John, of Auchenreoch, and of Woodham, in Scotland, Esq. for the manufacture of certain substances, which he denominates the "British Tapioca," and the cakes and flour to be made from the same. Sealed 24th April, 1830. No. 43, Vol. VIII, page 28.

— M'LEOD, John, of Westminster, Middlesex, Esq., for improvements in manufacturing certain substances so as to produce barilla. Sealed 10th August, 1829. No. 27, Vol. V, page 152.

— M'CURDY, John, of Cecil-street, Strand, Esq., in consequence of a communication, and discoveries by himself, for improvements in the rectification of spirits. Sealed 28th April, 1827.
No. 6, Vol. I, page 358.

————, John, of Great James-street, Bedford-row, Middlesex, Gent., in consequence of a communication for improvements in mills and mill-stones for grinding. Sealed 2nd November, 1829.
No. 32, Vol. IX, page 204.

— MEADEN, John, of Millbrook, near Southampton, Hants, coach-maker, for certain improvements on carriage wheels. Sealed 4th December, 1827, No. 10, Vol. II, page 216.

To MELVILLE, John, of Upper Harley-street, Cavendish-square, Middlesex, Esq., for his improvements in propelling vessels. Sealed 18th September, 1828. No. 36, Vol. VI, page 320.

— MELLOR, Samuel, of Holmfirth, cloth-dresser, and Charlesworth, Joseph and Joshua, of the same place, woollen manufacturers and merchants, all in the county of York, for their improvements in gig-mills for finishing woollen cloths, &c. Sealed 18th December, 1828. No. 43, Vol. VIII, page 24.

— MENCKE, William, of Park-place, Peckham, Surrey, Gent., for improvements in materials for and making bricks. Sealed 11th August, 1828. No. 50, Vol. IX, page 65.

— MILLER, Charles Taverner, of Piccadilly, Middlesex, wax-chandler, for his improvements in making candles. Sealed 4th February, 1830. No. 42, Vol. VII, page 341.

— MILLS, William, of Hazelhouse, Bisley, Gloucester, Gent., for his improvements in fire-arms. Sealed 18th October, 1826. No. 7, Vol. II, page 20.

— MILNE, John, of Edinburgh, architect, for a machine for dressing stones used in masonry, by the assistance of a steam-engine or other power, thereby saving a great quantity of manual labour. Sealed 15th September, 1829. No. 52, Vol. IX, page 202.

— MINIKEN, Thomas, of Berwick-street, St. James's, Middlesex, cabinet-maker, for his improvements in making chairs, sofas, and all other articles of furniture, and also of travelling and other carriages. Sealed 11th September, 1828. No. 38, Vol. VII, page 80.

— MINTER, George, of Princes-street, Soho, Middlesex, cabinet manufacturer, for his improvement in making chairs, denominated Minter's reclining chair. Sealed 9th November, 1830. No. 39, Vol. VII, page 156.

— M'MILLAN, Charles, of Heneage-street, Spitalfields, Middlesex, and Roland, James, of the same place, engineers and millwrights, for their improved mode of making streets and highways in general. Sealed 11th August, 1829. No. 51, Vol. IX, page 174.

— MOFFAT, James, of King's Arms-yard, Coleman-street, in the city of London, master-mariner, for his improved apparatus for securing chain cables, and for weighing anchors attached thereto, either with or without a messenger. Sealed 3rd June, 1828. No. 39, Vol. VII, page 155.

— MOLINEUX, Francis, of Hampstead, Middlesex, Gent., and Bundy, William, of Kentish-town, Middlesex, machinist, for improvements in machinery for spinning and twisting silk and wool, and for roving, spinning, and twisting cotton, flax, hemp, and other fibrous substances. Sealed 21st September, 1830. No. 44, Vol. VIII, page 49.

— MOORE, Thomas William Channing, of New York, America, now of Hampstead, Middlesex, merchant, in consequence of a communication from a foreigner abroad, of improved machinery for making hats or caps. Sealed 10th December, 1828. No. 13, Vol. III, page 26.

————, John, of Broad Weir, Bristol, Gent., for improved machinery for propelling carriages, ships, or other floating bodies, and for guiding propelled carriages, and apparatus for condensing the steam of steam-engines, after it has propelled the steam-engine piston. Sealed 30th September, 1829. No. 50, Vol. IX, page 57.

— MORAND, Samuel, of Manchester, merchant, for an improved stretching machine. Sealed 14th April, 1831. No. 45, Vol. VIII, page 137.

— MORE, Robert, of Underwood, Stirlingshire, Scotland, distiller, in

consequence of communications from foreigners abroad, and discoveries by himself, for improvements in preparing and cooling worts or wash from vegetable substances for the production of spirits. Sealed 18th July, 1827. No. 8, Vol. II, page 97.

To MORE, Robert, of Underwood, Stirlingshire, Scotland, distiller, in consequence of communications from foreigners abroad, and discoveries by himself, for certain processes for rendering distillery refuse productive for spirits. Sealed 18th July, 1827. No. 8, Vol. II, page 98.

— MORFIT, John, of Cookridge, near Leeds, York, bleacher, for an improvement on retorts, used by bleachers and makers of oxymuriatic acid, or of oxymuriate of lime. Sealed 15th December, 1828. No. 24, Vol. IV, page 341.

— MORGAN, Thomas, of Tipton, Stafford, manufacturer of tin-plate, for a new method of manufacturing iron plates, or black plates for tinning. Sealed 9th September, 1829. No. 28, Vol. V, page 218.

———, William, of York-terrace, Regent's-park, Middlesex, Esq., for improvements in steam-engines. Sealed 14th February, 1831. No. 48, Vol. VIII, page 302.

— MORNAY, Aristides Franklin, of Ashburton-house, Putney-heath, Surrey, Esq., in consequence of a communication from a foreigner abroad, and discoveries by himself, for improvements in smelting ores, &c. containing metals, or extracting such metals from such ores, &c. Sealed 27th March, 1827. No. 15, Vol. III, page 157.

— MUIR, Malcolm, of Glasgow, for certain machinery for preparing boards for flooring and other similar purposes. Sealed 1st June, 1827. No. 3, Vol. II, page 68.

— MULLER, William, of Doughty-street, Bedford-row, Middlesex, captain of our German Legion, for an apparatus for teaching mathematical geography, astronomy, and other sciences, for the use of resolving problems in navigation, spheres, and other sciences. Sealed 10th July, 1828. No. 11, Vol. II, page 281.

— MUNCH, Auguste, of the Poultry, in the city of London, mechanic, and Day, Francis, of the same place, optician, in consequence of a communication from a foreigner abroad, and improvements by themselves, for certain improvements on musical instruments. Sealed 19th June, 1829. No. 32, Vol. IX, page 197.

— NAIRN, William, of Dano-street, Edinburgh, Mid-Lothian, mason, for improved methods of propelling vessels by steam or other force. Sealed 5th February, 1828. No. 37, Vol. VII, page 19.

— NAISH, Francis, of Stoneaster, near Wells, Somerset, Gent., for certain improvements in the manufacture of silks mixed with other articles. Sealed 2nd November, 1829. No. 52, Vol. IX, page 219.

— NAPIER, David, of Warren-street, Fitzroy-square, Middlesex, engineer, for improvements in machinery applicable to letter-press printing. Sealed 2nd October, 1828. No. 19, Vol. IV, page 29.

———, of Warren-street, Fitzroy-square, engineer, and Napier, James and William, of Glasgow, engineers, for improvements in machinery for propelling locomotive carriages. Sealed 1th March, 1831. No. 47, Vol. VIII, page 245.

— NEALE, Francis, of Gloucester, barrister-at-law, for a combination of machinery for propelling vessels. Sealed 7th January, 1829. No. 51, Vol. IX, page 126.

— NEILSON, James Beaumont, of Glasgow, Lanark, North Britain, engi-

neer, for an improved application of air to produce heat in fire forges and furnaces where bellows are required. Sealed 11th September, 1828.
No. 37, Vol. VII, page 20.

To NEVILLE, James, of New-walk, Shad Thames, Surrey, engineer, for an improved steam carriage. Sealed 15th January, 1827.
No. 12, Vol. II, page 326.

————————, of New-walk, Shad Thames, Surrey, engineer, for an improved machine for obtaining mechanical power from falls and running streams of water. Sealed 25th September, 1828.
No. 51, Vol. IX, page 141.

— NEWTON, William, of Chancery-lane, Middlesex, civil-engineer, draftsman, and agent for patents, in consequence of a communication from a foreigner abroad, for an improved surgical chair-bed. Sealed 15th January, 1828. No. 15, Vol. III, page 155.

— NICHOLLS, John, of Pershall, Stafford, Gent., for improvements in the lever, and the application of its power. Sealed 25th July, 1829.
No. 19, Vol. IV, page 35.

— NICHOLSON, William, of Manchester, civil-engineer, and Coles, Charles Boswell, late of Duke-street, Manchester-square, Middlesex, Esq., in consequence of a communication from a person abroad, for a new method of constructing gasometers or machines for holding and distributing gas for illumination. Sealed 20th February, 1827.
No. 15, Vol. III, page 152.

— NORTH, William, of Guildford-place, Kennington, Surrey, surveyor, for an improved method of constructing ceilings and partitions for dwelling-houses or other buildings, in order to render the same more secure against fire. Sealed 4th July, 1829. No. 21, Vol. IV, page 135.

— OGLE, Nathaniel, of Millbrook, Hants, Esq., and Summers, William Alltoft, of St. George's-place, St. George's in the East, Middlesex, engineer, for improvements in steam-engines, applicable to vessels, locomotive carriages, &c. Sealed 13th April, 1830. No. 41, Vol. VIII, page 89.

— ORR, Matthew, of Greenock, North Britain, sail-maker, and Ramsay, James and Andrew, of the same place, cordage and sail-cloth manufacturers, for an improvement in making sails. Sealed 20th March, 1830.
No. 43, Vol. VIII, page 15.

— ORSON, Edward Forbes, of Finsbury-square, Middlesex, Gent., for an improved cartridge for sporting purposes. Sealed 18th September, 1828.
No. 22, Vol. IV, page 187.

— OSLER, Thomas, of Birmingham, chandelier-furniture manufacturer, for improvements in chandeliers and other articles of ornamental lighting. Sealed 10th November, 1829. No. 51, Vol. IX, page 158.

— OTWAY, Thomas, of Walsall, Stafford, ironmonger, for an expedient for stopping horses when running away with riders, or in carriages. Sealed 21st February, 1828. No. 4, Vol. I, page 216.

— PALMER, James, of Globe-road, Mile End-road, Middlesex, paper-maker, for improvements in machinery for making paper. Sealed 6th May, 1828. No. 11, Vol. II, page 279.

————————, Henry Robertson, of the London Docks, Middlesex, civil-engineer, for improvements in the construction of warehouses and other buildings, intended for the protection of property. Sealed 28th April, 1829. No. 17, Vol. III, page 234.

————————, George Vaughan, of St. Peter, Worcester, artist, for a machine to cut and excavate earth. Sealed 8th June, 1830.
No. 42, Vol. VII, page 314.

To PARKER, Samuel, of Argyle-street, city of Westminster, Middlesex, bronzist, for improvements in lamps. Sealed 1st February, 1827.
No. 19, Vol. II, page 151.

————, Robert, of Hackney, Middlesex, lieutenant in the Royal Navy, for an improved drag for coaches. Sealed 31st January, 1829.
No. 51, Vol. IX, page 127.

— PARKINSON, William, of Barton-upon-Humber, Lincoln, Gent., and Crosley, Samuel, of Cottage-lane, City-road, Middlesex, gas-apparatus manufacturer, for an improved method of constructing and working an engine for producing power and motion. Sealed 1st August, 1827.
No. 5, Vol. I, page 299.

— PARR, William, of Union-place, City-road, Middlesex, Gent., and Bluett, James, of Blackwall, Middlesex, ship-joiner, for a new method of producing a reciprocating action by means of a rotatory motion for the working of pumps and other machinery. Sealed 22d December, 1828.
No. 21, Vol. IV, page 131.

— PARSONS, William, of our Royal Dock-yard, Portsmouth, naval-architect, for improvements in building ships. Sealed 24th July, 1826.
No. 3, Vol. I, page 164.

— PATTISON, Granville Sharpe, of Old Burlington-street, Westminster, Middlesex, Esq., in consequence of a communication from a foreigner abroad, of an improved method of applying iron in the sheathing of ships, and of applying iron bolts, spikes, and other fastenings used in the construction of ships. Sealed 4th December, 1823
No. 17, Vol. III, page 247.

— PAYNE, William, of New Bond-street, Middlesex, watch-maker, for an improved pedometer for the waistcoat pocket. Sealed 15th February, 1831. No. 39, Vol. VII, page 137.

————, Benjamin Matthew, of the Strand, Middlesex, scale-maker, for improvements in weighing machines. Sealed 18th August, 1828.
No. 49, Vol. IX, page 27.

— PEARCE, John, of Tavistock, Devon, ironmonger, for improvements in wheels for carriages. Sealed 5th August, 1830.
No. 39, Vol. VII, page 144.

————, Henry George, of Liverpool, master-mariner, and Gardner, Richard and Joseph, of the same place, merchants, for an improved fid. Sealed 7th September, 1830. No. 42, Vol. VII, page 332.

— PEARSON, Charles, Jun., of Greenwich, Kent, Esq., Witty, Richard, of Hanley, Stafford, engineer, and Gillman, William, of Whitechapel, Middlesex, engineer, for improved methods of applying heat to useful purposes. Sealed 13th December, 1826. No 6, Vol. I, page 334.

— PEEK, Thomas, of St. John-street, Clerkenwell, Middlesex, engineer, for a new revolving steam-engine. Sealed 1st August, 1827.
No. 34, Vol. VI, page 208.

— PERCIVAL, William, of Knightsbridge, Middlesex, veterinary surgeon, for an improvement in applying shoes without nails to the feet of horses and certain other animals. Sealed 17th January, 1828.
No. 26, Vol. V, page 78.

— PERKINS, James, of Fleet-street, in the city of London, engineer, for improvements in machinery for propelling steam-vessels. Sealed 2nd July, 1829. No. 41, Vol. VII, page 276.

— PERRY, James, of Red Lion-square, Middlesex, bookseller and stationer, for improvements on pens. Sealed 24th April, 1830.
No. 42, Vol. VII, page 330.

To PERTUIS, Marie Elizabeth Antoinette, late of Rue-de-bal, Paris, spinster, in consequence of a communication from a native of France, for an invention for the fabrication of coal for refining sugar and other matters. Sealed 23rd December, 1830. No. 47, Vol. VIII, page 251.

— PHILIP, Edward Dakin, of Regent-street, St. James's, Westminster, Middlesex, chemist, for an improved distilling apparatus. Sealed 29th November, 1826. No. 51, Vol. IX, page 138.

— PHILLIPS, Charles, of Rochester, Kent, captain in our Royal Navy, for improvements on capstans. Sealed 8th June, 1827. No. 32, Vol. VI, page 88.

———, John, of Arnold, Nottingham, servant-man, for improvements on bridles. Sealed 21st February, 1831. No. 42, Vol. VII, page 312.

———, Peregrine, Jun., of Bristol, vinegar-maker, for improvements in manufacturing sulphuric acid, commonly called oil of vitriol. Sealed 21st March, 1831. No. 46, Vol. VIII, page 202.

— PINKUS, Henry, of Philadelphia, North America, but now of the Quadrant-hotel, Regent-street, Middlesex, Gent., for an improved apparatus for generating gas for lights and other purposes. Sealed 15th August, 1827. No. 5, Vol. I, page 272.

———, of Philadelphia, North America, but now of the Quadrant hotel, Regent-street, Middlesex, Gent., for an improved method of purifying carburetted hydrogen gas for illumination. Sealed 17th November, 1827. No. 5, Vol. I, page 279,

———, Henry, of Thayer-street, Manchester-square, Middlesex, Gent., and Collier, James, of Newman street, Oxford-street, Middlesex, civil-engineer, for an improved apparatus for generating gas for illumination. Sealed 5th April, 1830. No. 33, Vol. VI, page 132.

— PLATT, John, of Salford, Manchester, fustian-dresser, in consequence of certain communications from a foreigner abroad, for improvements in machinery for combing wool and other fibrous materials. Sealed 10th November, 1827. No. 38, Vol. VII, page 68.

— POCOCK, George, of Bristol, Gent, for improvements in making globes for astronomical and other purposes. Sealed 4th February, 1830. No. 31, Vol. VI, page 22.

———, of Bristol, Gent., and Viney, James, of Shanklen, in the Isle of Wight, colonel in our Royal Artillery, for improvements in carriages, and the application of a power to draw the same, also applicable to ships, raising weights, &c. Sealed 18th October, 1826. No. 1, Vol. I, page 29.

— POOL, William, of St. Michael on the Mount, Lincoln, smith, for improvements in machinery for propelling vessels, and giving motion to mills and other machinery. Sealed 26th May, 1829. No. 19, Vol. IV, page 83

———, John, of Sheffield, York, shop-keeper, for improvements in steam boilers and generators, also applicable to the evaporation of the fluids. Sealed 4th July, 1826. No. 1, Vol. I, page 35.

———, Moses, of Lincoln's Inn, Gent., in consequence of a communication from a foreigner abroad, for improvements in the apparatus used for certain processes of extracting molasses or syrup from sugar. Sealed 26th June, 1830. No. 50, Vol. IX, page 61.

———, of Lincoln's Inn, Gent., in consequence of a communication from a foreigner abroad, for certain improved machinery for kneading dough. Sealed 19th June, 1829. No. 51, Vol. IX, page 129.

To POOL, Moses, of Lincoln's Inn, Gent., in consequence of a communication from a foreigner abroad, for improvements in the apparatus for raising or generating steam, and the application thereof to locomotive engines, &c. Sealed 8th July, 1829. No. 52, Vol. IX, page 184.

— PORTER, George Richardson, of Old Broad-street, city of London, merchant, and Beale, Joshua Taylor, of Church-lane, Whitechapel, Middlesex, engineer, for a new mode of communicating heat for various purposes. Sealed 19th January, 1828. No. 6, Vol. I, page 342.

— POULTON, George, of Stafford-street, Old Bond-street, Middlesex, tailor, for a machine for writing, which he denominates a self-supplying pen. Sealed 4th July, 1827. No. 9, Vol. II, page 160.

— POWELL, John, Thomas, and William, of Bristol, glass-merchants, for improvements in machinery for forming moulds for refining sugar, and in the application of materials for making the same. Sealed 17th May, 1828. No. 46, Vol. VIII, page 191.

— POWNALL, William, of Manchester, weaver, for improvements in making healds for weaving purposes. Sealed 6th March, 1828. No. 18, Vol. III, page 322.

— PRATT, Samuel, of New Bond-street, Middlesex, camp-equipage maker, for improvements on elastic beds, cushions, and other similar articles. Sealed 25th June, 1828. No. 11, Vol. II, page 274.

— PRICE, Henry Cruger, and Price, Charles Fox, of Bristol, ironmongers, for an improved apparatus for communicating heat by means of the circulating of fluids. Sealed 20th August, 1829. No. 50, Vol. IX, page 68.

— PRIOR William, of Albany-road, Camberwell, Surrey, Gent., for improvements in machinery for securing and striking the top-masts of ships and other vessels. Sealed 11th April, 1829. No. 29, Vol. V, page 261.

— PROSSER, Thomas, of Worcester, architect, for improvements in and the mode of hanging window-sashes. Sealed 6th March, 1830. No. 33, Vol. VI, page 126.

————, Richard, of Birmingham, civil-engineer, for improvements in manufacturing nails or tacks for ornamenting boxes and articles of furniture. Sealed 13th July, 1831. No. 43, Vol. VIII, page 29.

— PUMPHREY, Julius, of Tally Hill, Worcester, glover, for improvements in steam-engines and machinery to propel steam-vessels, applicable to other purposes. Sealed 3rd February, 1829. No. 24, Vol. IV, page 328.

— QUARRILL, Thomas, of Peter's-hill, Doctors' Commons, city of London, lamp-manufacturer, for improvements in lamps. Sealed 20th December, 1826. No. 7, Vol. II, page 15.

— QUETIN, Louis, of Great Winchester-street, city of London, professor of mathematics, in consequence of a communication from a person abroad, for an improved vehicle for conveyance of passengers and luggage, constructed upon a principle of security against overturning. Sealed 25th July, 1829. No. 52, Vol. IX, page 181.

— RAMSAY, James and Andrew, both of Greenock, North Britain, sail-cloth manufacturers, and Orr, Matthew, of the same place, sail-maker, for improvements in the manufacture of canvass for sails. Sealed 20th March, 1830, No. 43, Vol. VIII, page 15.

— RAYNER, Joseph, of King-square, St. Luke's, Middlesex, civil-engineer, for improvements in machinery for conducting heat, and applying the same to washing, scouring, and finishing woollen cloths, and in calendering and finishing silks, cotton, &c. Sealed 5th February, 1829. No. 18, Vol. III, page 306.

To REDMUND, David, of Greek-street, Soho, Middlesex, engineer, for improvements in the construction of hinges. Sealed 22d December, 1826. No. 16, Vol. III, page 202.

— REID, John Paterson, of Glasgow, merchant, for improvements on power-looms. Sealed 4th April, 1827. No. 32, Vol. VI, page 81.

— RENNOLDSON, George, of South Shields, Durham, miller, for improvements in rotary steam-engines. Sealed 4th December, 1828. No. 50, Vol. IX, page 100.

— REVIS, Thomas, of Kennington-street, Walworth, Surrey, watch-maker, for an improved method of lifting weights. Sealed 10th July, 1823. No. 46, Vol. VIII, page 185.

— REWCASTLE, Ralph, of Newcastle-upon-Tyne, millwright, for an improved method of ballasting ships or vessels. Sealed 13th December, 1827. No. 36, Vol. VI, page 335.

— RHODES, Joseph, jun., of Alverthorpe, Wakefield, York, worsted-spinner, for improvements in machinery for spinning worsted, &c. Sealed 18th September, 1828. No. 51, Vol. IX, page 120.

— RICHARDS, William Westley, of Birmingham, gun-maker, for improvements in touch-holes of guns and other fire-arms. Sealed 11th February, 1831. No. 39, Vol. VII, page 135.

— RIDER, Benjamin, of Redcross-street, Southwark, Surrey, hat-tip manufacturer, for improvements in hat-tips. Sealed 17th July, 1828. No. 13, Vol. III, page 40.

— RILEY, ——, of Union-street, Southwark, Surrey, engineer, for an improved apparatus, to be attached to carriages, for affording safety in travelling. Sealed 10th December, 1823. No. 14, Vol. III, page 79.

— ROBERTS, Samuel, of Park Grange, near Sheffield, York, silver-plater, for improvements in plating copper or brass, or mixtures of the same with other metals with two metals or substances upon each other, also making such kind of articles with the said metal when so plated. Sealed 26th July, 1830. No. 43, Vol. VIII, page 24.

——————, Richard, of Manchester, civil-engineer, for certain improvements in the mechanism employed to render self-acting the machines known by the names of mule, billy, jenny, jack-frame, or stretching-frame, and all other machines of that class. Sealed 1st July, 1830. No. 47, Vol. VIII, page 233.

—, John, of St. Helen's, near Liverpool, at present of Wood-street, Cheapside, London, engineer, and Upton, George, of Queen-street, Cheapside, London, oil-merchant, for improvements in argand and other lamps. Sealed 24th November, 1827. No. 33, Vol. VI, page 138.

— ROBERTSON, John, of Limehouse-hole, Poplar, Middlesex, rope-manufacturer, for improvements in the manufacture of hempen rope. Sealed 4th September, 1828. No. 36, Vol. VI, page 336.

——————, Archibald, of Liverpool, ship-carver, for improvements in paddles for propelling ships. Sealed 7th January, 1829. No. 38, Vol. VII, page 86.

— ROBINSON, Joseph, of Merchant's-row, Limehouse, Middlesex, brush-maker, for an improvement in making brushes of certain descriptions. Sealed 4th December, 1827. No. 7, Vol. II, page 11.

——————, Solomon, of Leeds, York, flax-dresser, for improvements in machinery for heckling and cleaning hemp, flax, and tow. Sealed 16th June, 1827. No. 19, Vol. II, page 137.

To ROBINSON, Marmaduke, of Great George-street, Westminster, navy-agent, in consequence of a communication from a person abroad, for improvements in making and purifying sugars. Sealed 5th August, 1830. No. 47, Vol. VIII, page 258.

— RODGERS, George, of Sheffield, York, cutler, Hobson, Jonathan Cripps, of the same place, merchant, and Brownill, Jonathan, of the same place, cutler, for improvements on table-forks. Sealed 23d December, 1828. No. 13, Vol. III, page 42.

— ROGER, William, of Norfolk-street, Strand, Middlesex, lieutenant in our Royal Navy, for improvements on anchors. Sealed 13th March, 1828. No. 37, Vol. VII, page 29.

————————, of Norfolk-street, Strand, Middlesex, lieutenant in our Royal Navy, for certain improvements on cat-head stoppers. Sealed 30th September, 1829. No. 50, Vol. IX, page 92.

, of Norfolk-street, Strand, Middlesex, lieutenant in our Royal Navy, for improvements on anchors. Sealed 21st August, 1829. No. 50, Vol. IX, page 94.

— ROLAND, James, of Heneage-street, Spitalfields, Middlesex, and M'Millan, Charles, of the same place, engineers, for an improved mode of making streets and highways in general. Sealed 11th August, 1829. No. 51, Vol. IX, page 174.

— ROLFE, Thomas Hall, of Cheapside, city of London, musical-instrument maker, for improvements upon the self-acting piano-forte. Sealed 11th August, 1829. No. 52, Vol. IX, page 215.

— ROPER, Henry, of Baker-street, St. Marylebone, Middlesex, Esq., a rear-admiral in our Royal Navy, for an improved system of signals, for communicating by day and night between ships at sea. Sealed 21st June, 1827. No. 33, Vol. VI, page 137.

— ROSS, James Moore, of Symonds Inn, Middlesex, ironmonger, for an improved tap or cock for drawing off liquids. Sealed 19th January, 1829. No. 17, Vol. III, page 243.

— ROTCH, Benjamin, of Furnival's Inn, city of London, Esq., for his having invented a diagonal press for transferring perpendicular to lateral purposes. Sealed 22nd March, 1827. No. 5, Vol. I, page 292.

————————, of Furnival's Inn, Middlesex, barrister-at-law, for improved guards or protectors for horses' legs and feet. Sealed 20th March, 1830. No. 42, Vol. VII, page 325.

— RUDDER, William, of Eye, Gloucester, Gent., and Lawrence, John, of Birmingham, silversmith, for an improvement in saddles and girths. Sealed 10th August, 1830. No. 36, Vol. VI, page 316.

————————, Enoch William, and Martineau, Robert, of Birmingham, cock-founders, for improvements in cocks for drawing off liquids. Sealed 27th February, 1830. No. 42, Vol. VII, page 332

— SADLER, John Harvey, of Hoxton, Middlesex, machinist, for improvements in power-looms. Sealed 12th December, 1827. No. 39, Vol. VII, page 145.

— SALMON, Thomas, of Stoke-ferry, Norfolk, maltster, for an improved malt-kiln. Sealed 9th July, 1829. No. 49, Vol. IX, page 25.

— SANDERSON, Charles, of Park-gate Iron-works, near Rotherham, York, iron-master, for a new method of making shear steel. Sealed 4th September, 1828. No. 24, Vol. IV, page 338.

— SANDS, Thomas, of Liverpool, merchant, in consequence of a communication from a foreigner abroad, for improvements in spinning machines. Sealed 18th November, 1830. No. 39, Vol. VII, page 151.

To SCHOLEFIELD, George, of Leeds, York, mechanic, for improvements in looms for weaving woollen and other cloths. Sealed 13th March, 1828. No. 24, Vol. IV, page 313.

— SCHWIESO, John Charles, of Regent-street, Middlesex, musical-instrument maker, for improvements on certain stringed musical instruments. Sealed 22nd August, 1826. No. 4, Vol. I, page 225.

— SCOTT, Anthony, of Southwark-pottery, Durham, earthenware-manufacturer, for an apparatus for preventing the boilers of steam-engines and other similar vessels becoming foul, and for cleaning them when they become foul. Sealed 4th August, 1827. No. 7, Vol. II, page 23.

— SCULTHORPE, George King, of Robert-street, Chelsea, Middlesex, Gent., for improvements on axles, and couch and other springs. Sealed 4th July, 1829. No. 51, Vol. IX, page 165.

— SEAWARD, Samuel, of the Canal Iron-works, Poplar, Middlesex, for improvements in apparatus for economizing steam and the application thereof to steam-boilers on ship-board. Sealed 15th January, 1831. No. 46, Vol. VIII, page 199.

— SEIDLER, Charles, of Crawford street, Portman square, Middlesex, merchant in consequence of a communication from a foreigner abroad, for a method of drawing water out of wells, mines, &c. Sealed 20th December, 1826. No. 7, Vol. II, page 17.

— SELDEN, David, of Liverpool, merchant, in consequence of a communication from a foreigner abroad, for improvements in machinery used to give a degree of consistency to, and to wind on to bobbins, barrels, or spools, rovings of cotton, &c. Sealed 26th February, 1831. No. 44, Vol. VIII, page 74.

— SEVILL, Samuel, of Brownshill, Bisley, Gloucester, clothier, for improvements applicable to raising the pile, and dressing woollen and other cloths. Sealed 20th November, 1827. No. 11, Vol. II, page 285.

— SHAND, William, of the Burn, in Kincardineshire, Scotland, Esq., and Turner, Edward, of Gower-street, Middlesex, M.D., for a method of purifying sugars, &c. Sealed 26th June, 1830. No. 50, Vol. IX, page 60.

————————, of the Burn, in Kincardineshire, Scotland, Esq., for improvements in distillation. Sealed 10th August, 1829. No. 51, Vol. IX, page 173.

————————, of the Burn, in Kincardineshire, Scotland, Esq., for improvements in distillation and evaporation. Sealed 21st August, 1829. No. 52, Vol. IX, page 183.

— SHARP, William, of Manchester, cotton-spinner, for improvements in machinery for spinning or roving cotton, &c. Sealed 19th August, 1828. No. 51, Vol. IX, page 121.

— SHARPE, George Anthony, Esq., of Putney, Surrey, for an improved table-urn. Sealed 18th July, 1827. No. 12, Vol. II, page 340.

— SHEARS, Daniel Towers, of Bankside, Southwark, Surrey, coppersmith, for improvements in the apparatus for distilling, and in the process of distilling and rectifying. Sealed 31st March, 1830. No. 38, Vol. VII, page 61.

— SHENTON, John Suelson, of Husbands Bosworth, Leicester, plumber and glazier, for improvements in water-closets. Sealed 12th July, 1827. No. 2, Vol. I, page 84.

— SIEBE, Augustus, of Princes-street, Leicester-square, Middlesex, machinist, and Marriott, Henry, of Fleet-street, city of London, ironmonger, for improvements in hydraulic machines. Sealed 29th March, 1828. No. 8, Vol. II, page 89.

To SINISTER, James, of Birmingham, for improvements in weaving, preparing, or manufacturing a cloth or fabric, and the application thereof to the making of stays, &c. Sealed 18th December, 1828.
No. 51, Vol. IX, page 146.

— SKENE, Andrew Motz, of Jermyn-street, Middlesex, a lieutenant in our Royal Navy, for improvements in propelling vessels, and for working under-shot water-mills. Sealed 15th December, 1827.
No. 5, Vol. I, page 297.

— SLATER, John, of Birmingham, manufacturer of coach-springs and axletrees, for improvements in axletrees and the boxes for carriage-wheels. Sealed 15th December, 1828. No. 47, Vol. VIII, page 257.

— SMETHURST, James, of New Bond-street, Middlesex, lamp manufacturer, for improvements in lamps, communicated by a foreigner abroad. Sealed 6th November, 1827. No. 38, Vol. VII, page 66.

— SMITH, William, of Sheffield, York, merchant, for improvements in manufacturing cutlery and other articles of hardware. Sealed 20th February, 1827. No. 19, Vol. II, page 153.

————, James, of Bradford, York, corn-miller, for improvements in machinery for dressing flour. Sealed 4th June, 1829.
No. 24, Vol. IV, page 344.

—, Seth, of Wilton-crescent, Hanover-square, Middlesex, builder, for improvements in chimneys for buildings. Sealed 14th September, 1830. No. 42, Vol. VII, page 317.

Andrew, of Princes-street, Leicester-square, Middlesex, engineer, for improvements in machinery for propelling vessels on water, and in constructing such vessels. Sealed 22d January, 1831.
No. 42, Vol. VII, page 305.

————, Thomas, of Derby, engineer, for an improved piece of machinery, which being combined with parts of the steam-engine, or other engines, such as pumps, fire-engines, &c., will effect an improvement in each of them. Sealed 14th January, 1829. No. 51, Vol. IX, page 152.

————————, of Augustus street, mechanic, and Boase, John, of Albany-street, Gent., both in the county of Middlesex, for improvements in machinery for scraping and watering streets, roads, &c., applicable also to other purposes. Sealed 10th December, 1828.
No. 50, Vol. IX, page 67.

————, Andrew, of Wells-street, Oxford-street, Middlesex, builder, and Don, Thomas, of Lower James-street, Golden-square, Westminster, millwright, for their invention of methods of making iron or steel shutters and blinds, and fixing them. Sealed 15th June, 1827.
No. 2, Vol. I, page 90.

————————, late of York-terrace, parish of St. Margaret, Westminster, but now of Princes-street, Westminster, merchant, and Kitchen, William Henry, of High-street, St. Giles, Bloomsbury, Middlesex, for certain improvements in window frames, shutters, and doors, for the purpose of affording security. Sealed 7th February, 1829.
No. 25, Vol. V, page 26.

— SOAMES, James, jun., of Wheeler-street, Spitalfields, Middlesex, soap-maker, for a new manufacture of a certain material, produced from a vegetable substance, and the application thereof to the purpose of affording light and other uses. Sealed 9th September, 1829.
No. 27, Vol. V, page 148.

— SOMERS, Benjamin, of Langford, Somerset, M. D., for improvements on furnaces for smelting different kinds of metal, ores, and slags. Sealed 28th April, 1827. No. 7, Vol. II, page 24.

To SOWERBY, Thomas, of 'Change-alley, Cornhill, in the city of London, merchant, for his invention of certain improvements in the construction of ship's windlasses. Sealed 4th July, 1827.
No. 34, Vol. VI, page 209.

— SPINNEY, Thomas, of Cheltenham, Gloucester, gas-engineer, for improvements in manufacturing gas for illumination. Sealed 2d June, 1831.
No. 46, Vol. VIII, page 187.

— SPONG, William, of Aylesford, Kent, Gent., for diminishing friction in wheel-carriages, water-wheels, and other rotary parts of machinery. Sealed 15th August, 1827. No. 36, Vol. VI, page 326.

— STEAD, William, of Gildersome, in the county of York, millwright and machine-maker, and Stead, James, of Doncaster, in the same county, wood-valuer, for their invention of a paddle-wheel, upon an improved principle, for propelling steam-vessels. Sealed 18th December, 1828.
No. 28, Vol. IV, page 280.

— STEBBING, George, mathematical-instrument maker, High-street, Portsmouth, and Kingston, William, master millwright, of our Dockyard, Portsmouth, for certain improvements on instruments for the more readily ascertaining the trim and stability of ships. Sealed 20th December, 1826. No. 6, Vol. I, page 351.

— STEIN, Robert, of Regent street, Oxford-street, Middlesex, Gent., for an improvement in applying heat to the purposes of distillation. Sealed 13th December, 1827. No. 39, Vol. VII, page 141.

————————, of Regent-street, Oxford-street, Middlesex, Gent., for improvements in distillation. Sealed 4th December, 1828.
No 51, Vol. IX, page 142.

— STEENSTREEP, Paul, of Basing-lane, in the city of London, Esq., for certain improvements in machinery for propelling vessels, also applicable to other purposes. Sealed 11th December, 1827.
No. 10, Vol. II, page 191.

— STEPHENS, John Lee, of Plymouth, Devon, merchant, for improved methods of propelling vessels by the aid of steam or other power. Sealed 18th December, 1827. No. 4, Vol. I, page 223.

————————————, auctioneer, and Waycott, Peter, clock and watch maker, both of Plymouth, Devon, for improvements in mangles. Sealed 22d June, 1831. No. 42, Vol. VII, page 335.

— STEWART, James, of Store-street, Bedford-square, Middlesex, piano-forte-maker, for improvements on piano-fortes. Sealed 22d March, 1827.
No. 31, Vol. VI, page 15.

————————, John, of George-street, Euston-square, Middlesex, piano-forte-maker, for his improvements on piano-fortes. Sealed 2d November, 1829. No. 52, Vol. IX, page 219.

— STIRLING, Thomas, of the Commercial-road, Lambeth, Surrey, for improvements in filtering apparatus. Sealed 16th August, 1828.
No. 13, Vol. III, page 50.

————————, Robert, clerk minister of Galston, in Ayrshire, North Britain, and Stirling, James, of Glasgow, engineer, for their improvements in air-engines, for moving machinery. Sealed 1st February, 1827.
No. 17, Vol. III, page 245.

— STOCKER, George and Alexander, both of the parish of Yeovil, Somerset, gun-smiths, for their invention of a cock for drawing liquor from casks, which produces a stop superior to that effected by common cocks. Sealed 26th January, 1830. No. 34, Vol. VI, page 205.

To STOKES, James, of Cornhill, in the city of London, merchant, for improvements in making, boiling, clarifying, or preparing raw or Muscovado bastard sugar and molasses. Sealed 11th October, 1827.
No. 17, Vol. III, page 259.

— STORY, William, of Morely, in the parish of Batley, York, plumber and glazier, and Hirst, Samuel, of the same place, clothier, for their having discovered certain materials, which, when combined, are suited to be employed in scouring and cleansing of cloths and other fabrics. Sealed 10th March, 1829. No. 19, Vol. IV, page 25.

— STOTHART, Henry Asprey, of Bath, founder, for improvements or additions to ploughs. Sealed 4th April, 1827. No. 12, Vol. II, page 335.

— STRAHAN, William, of Avon Eitha, in the county of Denbigh, manufacturer, for an improvement in making alum. Sealed 12th June, 1828.
No. 29, Vol. V, page 266.

— STRAKER, George, of South Shields, Durham, ship-builder, for an improvement in ship's windlasses. Sealed 25th July, 1829.
No. 27, Vol. V, page 136.

— STRATTON, George, of Frederick-place, Hampstead-road, Middlesex, Gent., for an improvement in warming and ventilating buildings. Sealed 28th August, 1828. No. 14, Vol. III, page 97.

— STREET, John, of Clifton, Gloucester, Esq., for obtaining a rotatory motion by water, steam, gas, or other vapour, applicable also to the giving blast to furnaces, forges, &c. Sealed 5th August, 1830.
No. 32, Vol. VI, page 70.

— STURTEVANT, Charles Turner, of Hackney, Middlesex, soap boiler, for improvements in manufacturing soap. Sealed 26th May, 1829.
No. 24, Vol. IV, page 337.

— SUMMERS, William Alltoft, of St. George's-place, St. George's in the East, Middlesex, engineer, and Ogle, Nathaniel, of Millbrook, Hants, Esq., for improvements in steam engines, boilers, &c. Sealed 13th April, 1830. No. 44, Vol. VIII, page 85.

— SUMNER, William, of Hose, Leicester, lace-maker, for improvements in machinery for making bobbin-net lace. Sealed 6th February, 1831.
No. 45, Vol. VIII, page 149.

— TAYLOR, Peter, of Hollinwood, Lancaster, flax-dresser, for improvements in machinery for dressing flax, &c. Sealed 29th March, 1828.
No. 31, Vol. VI, page 4.

———, Enoch, of Marsden, York, millwright, and Crompton, Thomas Bonsor, of Tamworth, Lancaster, paper-maker, for improvements in paper-making. Sealed 13th May, 1828. No. 23, Vol. IV, page 284.

— THATCHER, Thomas, of Birmingham, saddler, for an elastic self-adapting saddle. Sealed 7th September, 1830.
No. 37, Vol. VII, page 17.

— THOMPSON, Simon, of Great Yarmouth, Norfolk, compass-maker, for certain improvements in piano-fortes. Sealed 27th February, 1830.
No. 31, Vol. VI, page 1.

— TILT, Joseph, of Prospect-place, Southwark, Surrey, merchant, in consequence of a communication from a foreigner abroad, for improvements in salt-pans, and the mode of applying heat to brine. Sealed 4th April, 1827. No. 11, Vol. II, page 283.

— TIPPETT, Thomas, of Gwennap, Cornwall, engineer, for improvements in working engines with steam and air. Sealed 2d October, 1828.
No. 50, Vol. IX, page 86.

To TORRENS, Robert, of Croydon, Surrey, a lieutenant-colonel in the Royal Marines, for certain apparatus for communicating power and motion. Sealed 9th September, 1829. No. 52, Vol. IX, page 200.

— TUCKER, John, of Hammersmith, Middlesex, brewer, for improvements in the construction of cannon. Sealed 9th September, 1829. No. 26, Vol. V, page 72.

————————, of Hammersmith, Middlesex, brewer, for an exploding shot or projectile. Sealed 2d November, 1829. No. 27, Vol. V, page 146.

— TURNER, George William, of the parish of St. Mary Magdalen, Bermondsey, Surrey, paper-maker, for improvements in making paper. Sealed 21st March, 1831. No. 44, Vol. VIII, page 69.

————————, Edward, of Gower-street, Middlesex, M.D., and Shand, William, of the Burn, in Kincardineshire, Scotland, Esq., for a new method of purifying sugars or other matters. Sealed 26th June, 1830. No. 50, Vol. IX, page 60.

— TUXFORD, William Wedd, of Boston, Lincoln, miller, for a machine for cleansing wheat, grain, &c. Sealed 6th July, 1830. No. 47, Vol. VIII, page 255.

— TYLER, Hayward, of Warwick-lane, in the city of London, brass-founder, for improvements in the construction of water-closets. Sealed 23d September, 1829. No. 52, Vol. IX, page 215.

— TYNDALL, Thomas, of Birmingham, Gent., in consequence of a communication from a foreigner abroad, for improvements in the manufacture of buttons. Sealed 4th December, 1827. No. 15, Vol. III, page 126.

————————, of Birmingham, Gent., in consequence of a communication from a foreigner abroad, for improvements in the machinery to be employed in making nails, brads, and screws. Sealed 18th December, 1827. No. 16, Vol. III, page 184.

— UDNY, John, of Arbour-terrace, Commercial-road, Middlesex, Esq., for certain improvements on the steam-engine. Sealed 14th January, 1829. No. 22, Vol. IV, page 191.

— ULRICH, John Gottlieb, of Cornhill, in the city of London, chronometer-maker, for improvements in chronometers. Sealed 19th April, 1828. No. 14, Vol. III, page 88.

— UNDERHILL, John, of Parkfield Iron-works, near Wolverhampton, in the county of Stafford, iron-master, for improvements in machinery for passing boats, &c., from a higher to a lower, or a lower to a higher level, with little or no loss of water, applicable also to the rising or lowering of weights on land. Sealed 13th August, 1827. No. 24, Vol. IV, page 326.

— UPTON, George, of Queen-street, Cheapside, in the city of London, oil-merchant, and Roberts, John, of St. Helen's, near Liverpool, at present residing in Wood-street, Cheapside, city of London, engineer, for improvements in argand and other lamps. Sealed 24th November, 1827. No. 33, Vol. VI, page 138.

— URE, Andrew, of Burton-crescent, Middlesex, M.D., for his having invented an apparatus for regulating temperature in distillation, &c. Sealed 20th October, 1830. No. 48, Vol. VIII, page 307.

———————, of Finsbury-circus, Middlesex, M.D., for an improved apparatus for distilling. Sealed 31st March, 1831. No. 48, Vol. VIII, page 310.

— UZIELLI, Matthew, of Clifton-street, Finsbury-square, Middlesex, Gent., in consequence of a communication from a foreigner abroad, for

improvements in the preparation of certain metallic substances, and the application thereof to the sheathing of ships, &c. Sealed 6th July, 1830. No. 41, Vol. VII, page 280.

To VARDY, James, of Wolverhampton, and Dixon, John, of the same place, for improvements in cocks for drawing off liquid. Sealed 13th December, 1830. No. 46, Vol. VIII, page 205.

— VAUGHAN, George, of Cleveland-street, Mile-end Old Town, Middlesex, engineer, for a machine or pump for raising water or other fluids. Sealed 23rd January, 1830. No. 26, Vol. V, page 66.

— VAZIE, Robert, of York-square, St. Pancras, Middlesex, civil-engineer for improvements in certain processes and machinery for preserving food' Sealed 12th July, 1827. No. 16, Vol. III, page 193.

— VENTURA, Angelo Benedetto, of Cirencester-place, Fitzroy-square, Middlesex, professor, of music, for improvements on the harp, lute, and Spanish guitar. Sealed 21st February, 1828. No. 27, Vol. V, page 145.

— VIGNOLES, Charles Blacker, of Furnival's Inn, London, and Ericsson, John, of Brook-street, Fitzroy-square, Middlesex, civil-engineers, for their invention of certain additions to the locomotive-engine. Sealed 7th September, 1830. No. 38, Vol. VII, page 81.

— VINEY, James, of Piccadilly, Middlesex, colonel in the Royal Artillery, for improvements in steam-boilers. Sealed 2d November, 1829. No. 48, Vol. VIII, page 305.

———————, of Shanklen, in the Isle of Wight, colonel in our Royal Artillery, and Pocock, George, of Bristol, Gent, for improvements in carriages and kites to draw the same, applicable also to the drawing of ships, &c., and for raising weights, &c. Sealed 18th October, 1826. No. 1, Vol. I, page 29.

— WALKER, Mark, and Lawson, Samuel, of Leeds, York, machine-makers and flax-spinners, for improvements in machinery for dressing hemp, &c. Sealed 9th October, 1828. No. 14, Vol. III, page 83.

———————, Samuel, of Beeston, Leeds, York, cloth-manufacturer, for an improved apparatus, denominated an "operameter," applicable to machinery for dressing woollen and other cloths. Sealed 20th February, 1829. No. 19, Vol. IV, page 19.

———————, James, of Weymouth-street, in the parish of St. Marylebone, Middlesex, Esq., for an improved castor for furniture. Sealed 10th November, 1827. No. 24, Vol. IV, page 330.

— WALMSLEY, Thomas, of Manchester, manufacturer, for improvements in the manufacture of cotton, &c. Sealed 13th December, 1830. No. 42, Vol. VII, page 322.

— WASON, Peter Rigby, Esq., of the Middle Temple, barrister-at-law, for improvements in stick sealing-wax. Sealed 25th September, 1828. No. 38, Vol. VII, page 84.

— WATT, James, of Stracey-street, Stepney, Middlesex, surgeon, for a method of destroying animal poison, and the disease consequent thereon effectually prevented. Sealed 29th April, 1828. No. 29, Vol. V, page 274.

— WAYCOTT, Peter, clock and watch-maker, and Stevens, John Lee, auctioneer, both of Plymouth, Devon, for improvements in mangles. Sealed 22d June, 1831. No. 42, Vol. VII, page 335.

— WAYTE, James Wills, late of Drury-lane, Middlesex, but now of Gough street, Mount Pleasant, Middlesex, printer, for certain improvements in printing machinery. Sealed 19th March, 1829. No. 21, Vol. IV, page 121.

To WEEKS, Edward, of King's-road, Chelsea, Middlesex, horticultural-builder, for improvements in raising, lowering, or conveying heated water or other fluids to various distances. Sealed 14th August, 1829.
No. 26, Vol. V, page 83.

— WEISS, Frederick Foveaux, of the Strand, Middlesex, surgical-instrument maker, for improvements in the construction of spurs. Sealed 6th November, 1827. No. 13, Vol. III, page 48.

————, John, of the Strand, Middlesex, surgical-instrument maker, for improvements on instruments for bleeding horses, &c. Sealed 26th January, 1828. No. 37, Vol. VII, page 21.

— WESTBY, Francis, of Leicester, cutler, for an apparatus for whetting or sharpening the edges of the blades of knives, &c. Sealed 6th May, 1828. No. 10, Vol. II, page 201.

————————————, of Leicester, cutler, for an apparatus for whetting or sharpening the edges of the blades of knives, &c. Sealed 26th November, 1829. No. 28, Vol. V, page 190.

— WESTLY, William King, and Busk, Robert, of Leeds, York, flax-spinners, for improvements in machinery for dressing hemp, &c. Sealed 29th August, 1826. No. 10, Vol. II, page 199.

— WESTWOOD, Thomas, of Princes-street, Leicester-square, Middlesex, watch-maker, for improvements in watches and time-keepers. Sealed 23rd September, 1829. No. 35, Vol. VI, page 268.

— WETTERSTEDT, Baron Charles, of Commercial-place, Commercial-road, Middlesex, for a composition for strengthening leather. Sealed 4th June, 1828. No. 17, Vol. III, page 263.

— WHEATSTONE, Charles, formerly of the Strand, but now of Conduit-street, Middlesex, musical-instrument maker, for improvements in wind-musical instruments. Sealed 19th June, 1829.
No. 52, Vol. IX, page 189.

— WHEELER, Robert, of High Wycombe, Bucks, brewer, for improvements on or in refrigerators for cooling fluids. Sealed 22d November, 1827. No. 4, Vol. I, page 212.

— WHITAKER, James, of Wardle, near Rochdale, Lancaster, manufacturer, for improvements in machinery for piecing cardings from woollen or cotton carding-engines, and for spinning wool and cotton. Sealed 24th April, 1827. No. 15, Vol. III, page 142.

— WHITE, John, of Southampton, Hants, engineer and iron-founder, for improvements in the construction of pistons or buckets for pumps. Sealed 1st February, 1827. No. 9, Vol. II, page 155.

————, James, of Paradise-street, Lambeth, Surrey, for a machine for filtering, which he denominates an artificial spring. Sealed 8th November, 1827. No. 24, Vol. IV, page 323.

— WHITING, John, of Ipswich, Suffolk, architect, for improvements in window sashes and frames. Sealed 9th January, 1827.
No. 2, Vol. I, page 99.

— WILKINSON, Samuel, of Holbeck, York, mechanic, for improvements in mangles. Sealed 4th December, 1827. No. 37, Vol. VII, page 22.

— WILKS, Joseph Browne, of Tandridge-hall, Surrey, Esq., for improvements in producing steam for steam-engines. Sealed 2d August, 1826.
No. 3, Vol. I, page 161.

—, John, of Blue Anchor-road, Bermondsey, Surrey, engineer, millwright, and machinist, for improvements in the apparatus for making paper by machinery. Sealed 28th April, 1830.
No. 41, Vol. VII, page 249.

To WILLIAMS, John, ironmonger and ships'-hearth manufacturer, and Doyle, John, merchant, both of the Commercial-road, Middlesex, for an apparatus for separating salt from sea-water. Sealed 4th August, 1826. No. 3, Vol. I, page 158.

————————, Thomas Robinson, of Norfolk-street, Strand, Middlesex, for improvements in the making of hats, bonnets, &c. Sealed 11th September, 1828. No. 13, Vol. III, page 31.

————————, Richard, of Canterbury-buildings, Surrey, civil-engineer, for improvements in the application of elastic and dense fluids to the propelling of machinery. Sealed 15th December, 1828. No. 24, Vol. IV, page 331.

————————, Orlando, Harris, of North Nibley, Gloucester, Esq., for improvements in machinery for propelling ships on water. Sealed 7th January, 1829. No. 35, Vol. VI, page 241.

-, Thomas Robinson, of Norfolk-street, Strand, Middlesex, Esq., for improvements in the manufacturing of felt, applicable to the covering ships' bottoms, &c. Sealed 23rd May, 1829. No. 51, Vol. IX, page 134.

- WILSON, Melvil, of Warnford-court, Throgmorton-street, in the city of London, merchant, in consequence of a communication from a foreigner abroad, for improvements in machinery for cleaning rice. Sealed 20th December, 1826. No. 7, Vol. II, page 12.

-, William, of Martin's-lane, Cannon-street, London, hat-manufacturer, for his having found out the means of extracting spirits or other solvents used in dissolving gums, &c. Sealed 4th July, 1827. No. 14, Vol. III, page 94.

— WINDUS, Ross, of Vernon, Sussex, State of New Jersey, North America, now resident in London, for improvements in diminishing friction in wheeled-carriages to be used on rail-roads, &c. Sealed 28th May, 1829. No. 51, Vol. IX, page 171.

— WINGFIELD, Robert Walter, of Birmingham, brass-founder, for an improvement in manufacturing tubes or rods applicable to bedsteads, &c. Sealed 4th December, 1827. No. 36, Vol. VI, page 337.

— WISE, Stacey, and Wise, Charles, of Maidstone, Kent, paper-makers, and De Soras, Gabriel, of Leicester-square, Middlesex, Gent., in consequence of a communication from a foreigner abroad, for improvements in sizing and beautifying the materials used in the manufacture of paper, &c. Sealed 21st August, 1827. No. 18, Vol. III, page 317.

— WITTY, Richard, of Hanley, Stafford, engineer, Pearson, Charles, jun., of Greenwich, Kent, Esq., and Gillman, William, of Whitechapel, Middlesex, engineer, for improved methods of applying heat. Sealed 13th December, 1826. No. 6, Vol. I, page 334.

————————————, of Hanley, Stafford, engineer, for improvements in making and supplying coal-gas. Sealed 10th June, 1828. No. 47, Vol. VIII, page 247.

————————, of Basford, Wolstanton, Stafford, engineer, for improvements in propelling by steam-carriages, boats, &c. Sealed 13th December, 1830. No. 47, Vol. VIII, page 248.

— WOODCROFT, Bennet, of Manchester, manufacturer, for an apparatus for printing linen, cotton, &c. Sealed 31st March, 1827. No. 1, Vol. I, page 32.

— WOODMAN, James, of Piccadilly, Middlesex, perfumer, for improvements on brushes. Sealed 22d March, 1827. No. 6, Vol. I, page 357.

To WORNUM, Robert, of Wigmore-street, Cavendish-square, Middlesex, piano-forte-maker, for improvements on piano-fortes. Sealed 24th July, 1828. No. 47, Vol. VIII, page 250.

— WRIGHT, Lemuel Wellman, of the Borough-road, Surrey, engineer, for improvements in trunks or carriages. Sealed 2d August, 1826. No. 2, Vol. I, page 80.

———————, of the Borough-road, Surrey, engineer, for improvements in the construction of cranes. Sealed 17th August, 1827. No. 28, Vol. V, page 185.

———————, of the Borough-road, Surrey, engineer, for improvements in machinery for cutting tobacco. Sealed 21st August, 1827. No. 28, Vol. V, page 217.

———————, of the Borough-road, Surrey, engineer, for improvements in machinery for making metal screws. Sealed 17th March, 1827. No. 30, Vol. V, page 313.

———————, of the Borough-road, Surrey, engineer, for improvements in machinery for making screws. Sealed 18th September, 1828. No. 30, Vol. V, page 314.

———————, of the Borough-road, Surrey, engineer, for improvements in wheel-carriages, and in the machinery for propelling or drawing the same. Sealed 15th April, 1828. No. 33, Vol. VI, page 148.

—, Samuel, of Shelton, Staffordshire, for a manufacture of ornamental tiles, bricks, &c. Sealed 26th January, 1830. No. 32, Vol. VI, page 79.

—, John, late of Princes-street, Leicester-square, but now of Jobbin's-court, Knightsbridge, Middlesex, engineer, for improvements in window-sashes. Sealed 11th October, 1827. No. 32, Vol. VI, page 90.

—, James, of Newcastle-upon-Tyne, soap-maker, for improvements in condensing gases. Sealed 28th April, 1829. No. 47, Vol. VIII, page 252.

— YATES, John, of Hyde, Chester, calico-printer, for giving a metallic surface to cotton, &c. Sealed 26th January, 1830. No. 30, Vol. V, page 347.

— YOUNG, George Johnson, of Newcastle-upon-Tyne, iron-founder, for improvements in ships' windlasses. Sealed 21st June, 1828. No. 46, Vol. VIII, page 191.

———————, John, of Willenhall, Wolverhampton, Stafford, and Carpenter, James, of the same place, locksmiths, for improvements on locks. Sealed 19th January, 1830. No. 39, Vol. VII, page 152.